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ANTI-OFFSET POWDER COMPRISING DEXTROSE POWDER AND SILICONE RESIN TREATED STARCH AND METHOD OF PREVENTING OFFSET FROM FRESHLY PRINTED PAPERS

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ABSTRACT OF THE DISCLOSURE

An effective, improved anti-offset powder particularly useful in offset planography and especially useful in anti-offset devices in which the powder is electrically charged prior to being dispensed for deposition on the freshly printed impression is provided with a composition comprising a mixture of dextrose having an average particle size of about 100μ and containing from 10 to 25% of a hydrophobic powder, such as a starch treated with a silicone resin to render the starch or other particles hydrophobic. A thin film of this powder effectively prevents offsetting from one sheet to another in the delivery stack, while allowing long press runs without contaminating the ink rollers or clogging of the printing plates.

SUMMARY

The invention provides an anti-offset powder which is especially adapted for use in printing by offset planography and is to be deposited as an exceedingly thin coating on the freshly printed sheets just prior to their being deposited on the delivery stack, thereby preventing the freshly printed impression on one sheet from being offset onto the back of the succeeding sheet deposited in the same stack.

The powder of the present invention comprises from 75 to 90% by weight of finely divided dextrose having an average particle size of from 50 to 150μ preferably about 100μ with which is thoroughly mixed from 10 to 25% of a hydrophobic silicone resin treated starch, and if desired from 0.5 to 0.03% of a free-flowing agent such as finely divided sodium-silico-aluminate or tribasic calcium phosphate.

The powder is preferably applied to the printed sheet by an electrostatic sprayer such as an Oxy-Dry sprayer typically illustrated in U.S. Patent No. 3,292,046.

OBJECT

The present invention has for its object the provision of a novel and improved anti-offset powder especially adapted for use with electrostatic sprayers of the Oxy-Dry type as disclosed in U.S. Patent No. 3,292,046, and more especially in connection with offset planography; and to a process using such powder.

As used herein, "anti-offset" refers to the prevention of offset or smutting from the freshly printed face of one sheet to the back face of a subsequent sheet as they are laid down in a delivery pile. Offset planography refers to the printing process in which a planographic plate is moistened and inked and the ink is then transferred to a resilient blanket atfer which an ink impression is transferred to a sheet or web of paper or other material.

PRIOR ART

In the prior art many powder comprising corn, tapioca, arrowroot or potato starch have been used to prevent offset in letterpress printing and offset planography. Sometimes these starch powders have been combined with a small content of tribasic calcium phosphate to improve their flow characteristics.

Additionally, anti-offset powders consisting essentially of starch particles coated with a small amount of a thermoset polysiloxane resin have been used, as disclosed in U.S. Patent No. 2,647,892.

More recently, according to British Patent No. 834,700 it has been proposed to use refined sucrose of a grain size from 20μ to 400μ as an anti-offset powder, to which may be added a minor amount (about 2%) of tri-basic calcium phosphate.

All of the foregoing have their several disadvantages in use. An anti-offset powder comprised essentially of starch tends to clog the blanket, ink-rollers and printing plates and interferes with the laying down of a subsequent impression on top of a first impression treated with such an anti-offset powder, thereby producing a splotchy print. Additionally the excess powder deposited on the printed and unprinted areas imparts a rough, undesirable feel to the surface and causes feed back of the starch to the ink-rollers and printing plates requiring frequent shut-downs and time consuming cleaning of the ink-rollers and printing plates.

Hydrophobic, resin-coated starch particles, by themselves, are also subject to disadvantages. The relatively large quantity of such hydrophobic starch particles needed to prevent offset from one printed sheet to the other face of another sheet, provides an excessively large quantity of starch on the imprinted areas, and while it improves, it does not eliminate the clogging of the ink-rollers, the filling of the printing plates, nor the blotching of a subsequent impression where the ink is printed onto a starch coated white portion of the sheet.

Powdered sucrose, with or without a small amount of tribasic calcium phosphate is disadvantageous for use in anti-offset sprayers due to the hygroscopic character of the sucrose. It cannot ordinarily be used except in atmospheres of low humidity such as much less than 50% R.H. Except in extremely dry atmospheres, powdered sucrose lumps, does not feed uniformly and consequently results in an uneven and ineffective deposit of anti-offset powder on the impressions. If too little powder is deposited, offset occurs, the sheets tend to stick together; if too much powder is deposited, a subsequent impression, as in two color or multi-color printing, tends to be splotchy, and the sheet surface is left with an uneven, rought surface which represents an undesirable feeling to the reader.

DESCRIPTION OF THE PREFERRED EMBODIMENT

According to the present invention, the improved anti-offset powder consists essentially of a well mixed mixture of

	Percent by weight
Dextrose powder	75–90
Silicon resin treated starch	10–25
Free flowing agent	0.5–0.03

preferably:

Dextrose powder	85
Silicon resin treated starch	15
Tribasic calcium phosphate, finely ground	0.2

The dextrose is preferably a substantially pure food grade of commercial dextrose having an average particle size of about 50 to 150μ, preferably 100μ and is free flowing, hydrophilic but not hygroscopic, as is sucrose.

The starch powder may be made from any of the

starches and have an average effective size as shown below:

Corn starch	About 15μ.
Tapioca starch	About 20μ.
Arrowroot starch	About 40–45μ.
Potato starch	About 70–75μ.

What ever starch powder is used, it is treated to render it hydrophobic and one such treatment is disclosed in the prior U.S. patent to La Brie and Fenn, No. 2,647,892 where the starch is treated with a low viscosity thermosetting silicone resin, which is distributed uniformly over the individual starch particles and is then treated as disclosed in U.S. Patent No. 2,647,892, to render the starch particles hydrophobic.

Where a free flowing agent is included in the hydrophobic resin-treated starch it may comprise finely ground sodium-silico-aluminate or tribasic calcium phosphate in an amount from 5.0 to 2.5% of the starch component or up to about 0.2% of the total powder to be sprayed. The preferred silicone resin for treating the starch is the same as disclosed in U.S. Patent No. 2,647,892, and may be applied in the same manner as described in said patent.

The dextrose powder and hydrophobic starch, and free flowing agent if used, are thoroughly blended and are then ready for use. Due to the non-hygroscopic properties of the dextrose and resin-treated particles, the powder may be stored for long periods of time at relatively high humidity without impairing its usefulness.

Also in use, the combined dextrose and hydrophobic starch mixture provides many additional and unexpected benefits.

As distinct from sucrose, the dextrose powder maintains its particulate granularity without the lumping which occurs with powdered sucrose even in atmospheres of moderate R.H.

As compared with the powder of U.S. Patent No. 2,647,892, the present invention allows the use of only a very minor amount of the hydrophobic starch powder so that the press run can be extended to a great extent before cleaning, and at no time is a sufficient quantity of the hydrophobic starch deposited on the printed sheet to impair a subsequent over-printed impression, nor to create an undesirable tactile sensation as the surface of the printed sheet is felt by the fingers of a reader, the resin-treated starch is gradually absorbed into the ink impression, and is present in only a minor amount so that its presence on the imprinted areas of a sheet creates no problem.

The dextrose powder, being only hydrophilic and not hygroscopic does not lump under humid operating conditions and is always available for uniform delivery by an electrostatic sprayer.

As the finely divided dextrose with its minor addition of hydrophobic starch is deposited on the freshly printed surface of a sheet the dextrose and hydrophobic starch on the ink impression are adhered to the oleagenous layer on the sheet but retain their shape so as to provjde the proper mechanical spacing of the freshly printed surface from the back of the next sheet laid down in the delivery pile.

The dextrose powder particles which are deposited on those parts of the sheet which do not have an ink impression printed by offset planography are gradually absorbed by the moisture on the face of the sheet, this moisture having been transferred from the moistened non-printing areas of the planographic printing member. The hydrophobic starch particles are not absorbed, but are present in such a minor amount that they do not interfere with the laying down of a subsequent impression of a different color in the previously imprinted areas, and some of the hydrophobic starch particles will be lost in the handling of the sheet between the first and second impression or between one impression and a later third or fourth impression.

The dextrose absorbed into the slightly moist surface of the paper does not impair the color nor does it provide an ink-rejecting surface to impair the quality of a subsequent impression.

The free flowing agent is present in such minute amounts that it does not interfere with obtaining the finest quality of subsequent impressions.

In use, the anti-offset powder of the present invention is applied to the surface of a sheet or web freshly printed by offset set planography, after which the web is rewound into a roll, or the successive sheets are stacked, one on top of another in the delivery of the press. The rate at which the powder is applied will vary widely depending upon the type of paper and the amount of ink being used, but ordinarily from 2 to 5 ounces of anti-offset powder per 1,000 square feet of paper printed, usually about 3 ounces per 1,000 square feet.

Although the invention finds its greatest usefulness in offset planography, the powder may be similarly used in letter-press printing, although in that case the dextrose will not normally be absorbed into the dry unprinted areas of the sheet.

What is claimed is:

1. An anti-offset powder comprising from 75 to 90% by weight dextrose powder, and from 10 to 25% by weight of hydrophobic, silicone resin treated starch having a particle size of from 15 to 75μ, the average particle sizes of the dextrose particles being from 50 to 150μ.

2. An anti-offset powder according to claim 1 in which the average effective dextrose particle size is about 100μ and the powder consists of

	Percent by weight
Dextrose	84.98
Hydrophobic, silicone resin treated starch	15.0
Free flowing agent comprising sodium-silico-aluminate or tribasic calcium phosphate	0.2

3. The method of preventing offset from a freshly printed surface of a sheet to an adjacent sheet in a delivery in offset planographic printing which comprises applying to the freshly printed face of a sheet an anti-offset powder comprising finely divided particles of dextrose 75 to 90% by weight, hydrophobic, silicone resin treated starch 10 to 25% by weight, the average particle size of the dextrose being from 50 to 150μ and the average effective size of the starch particles being from 15 to 75μ.

4. The method of claim 3 in which the powder consists of dextrose 84.98% by weight, hydrophobic, silicone-resin treated starch 15.0% by weight and from 0.5 to 0.03% by weight of a free flowing agent comprising sodium-silico-aluminate or tribasic calcium phosphate, the dextrose particles having an average size of about 100μ and the starch having an average effective size of from 15 to 75μ.

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