March 8, 1938. V. G. GREEN ET AL 2,110,219

METHOD OF PREVENTING OFFSET IN PRINTING

Filed July 31, 1937 3 Sheets-Sheet 1

Fig. 1

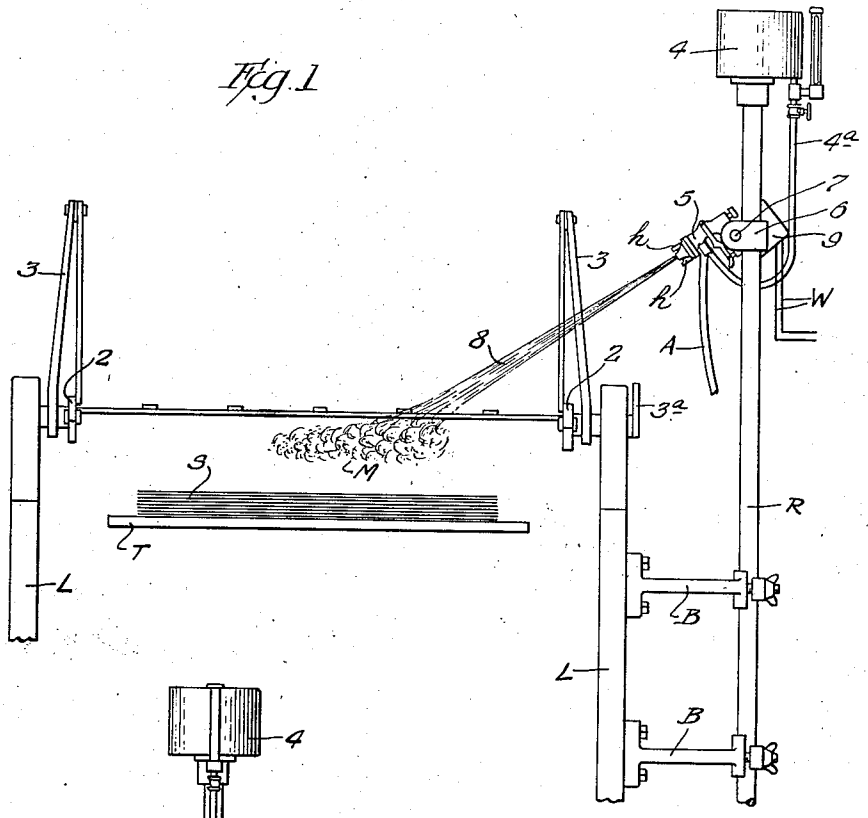
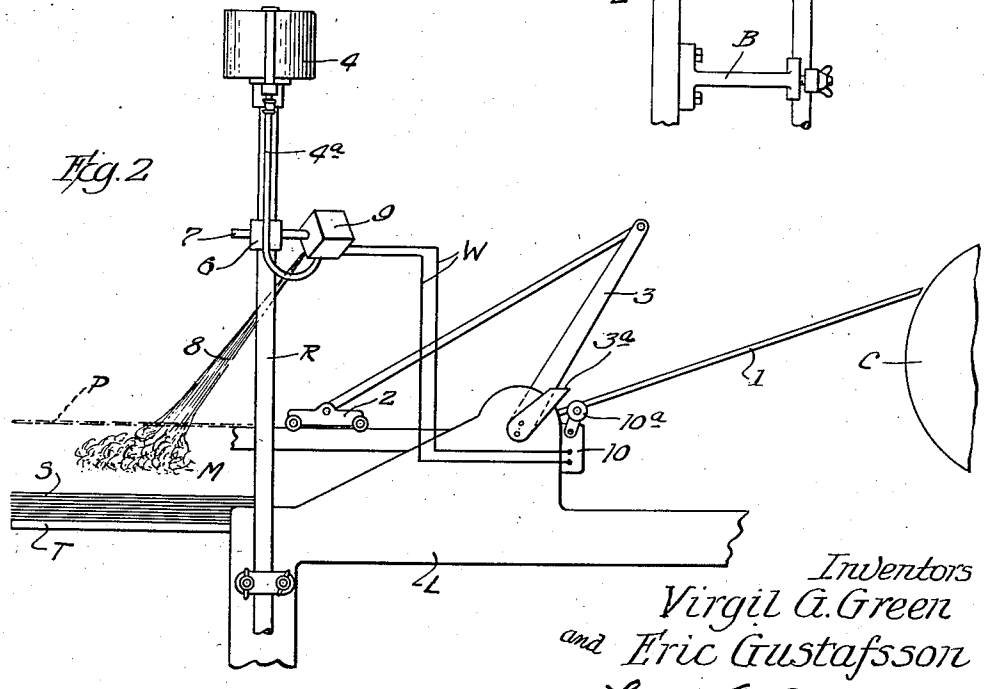



Fig. 2




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Filed July 31, 1937 3 Sheets-Sheet 2

Fig. 8

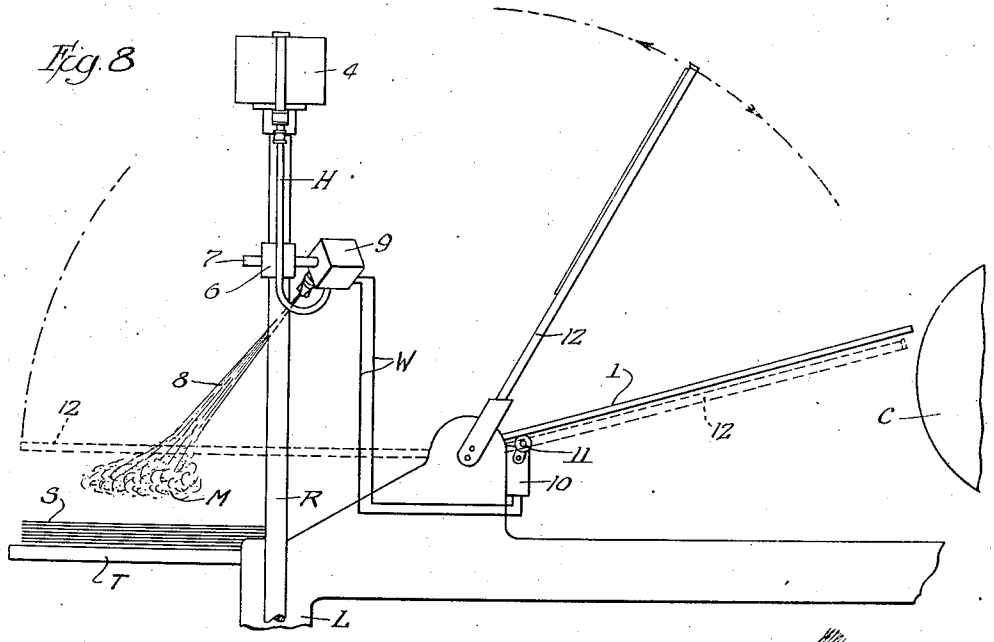



Fig. 3

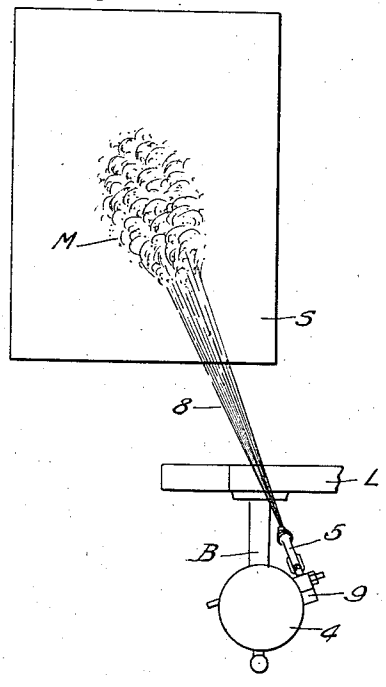



Fig. 4

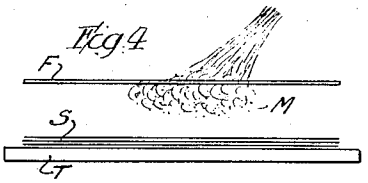



Fig. 5

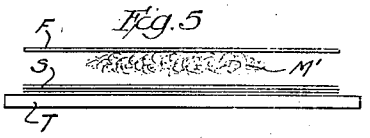



Fig. 7

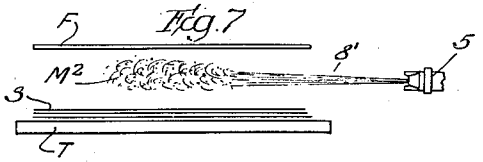
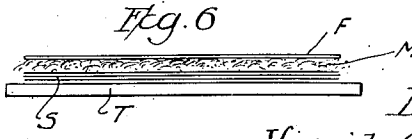



Fig. 6




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METHOD OF PREVENTING OFFSET IN PRINTING

Filed July 31, 1937 3 Sheets-Sheet 3

Fig. 9

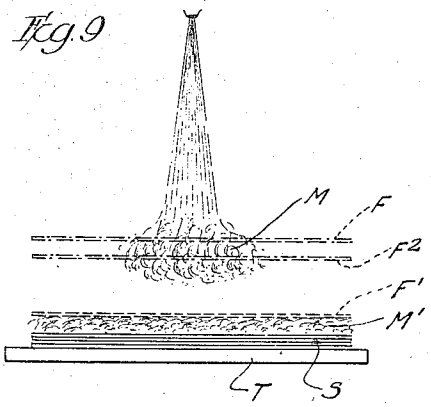



Fig. 10

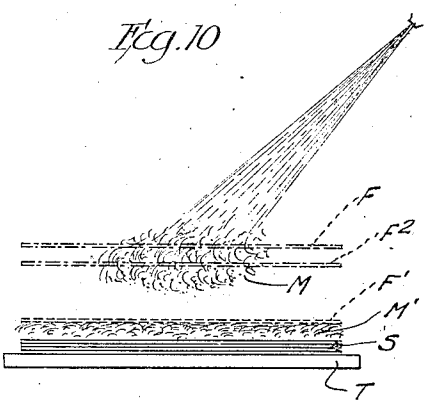



Fig. 11

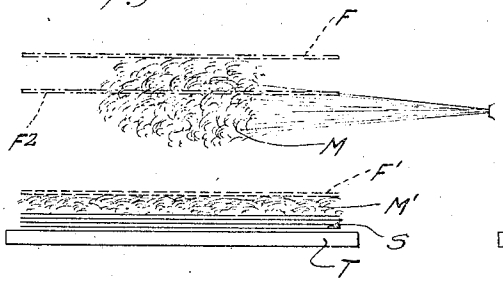



Fig. 12

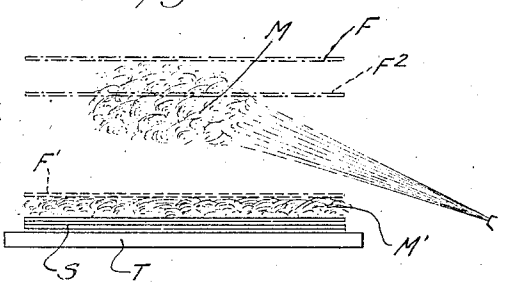



Fig. 13

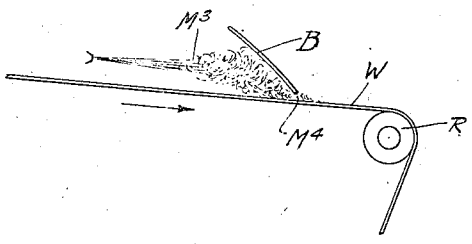
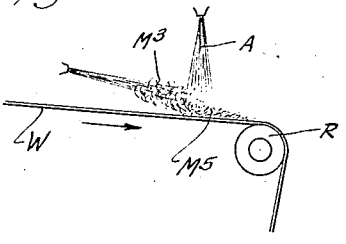



Fig. 14




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Patented Mar. 8, 1938 2,110,219

# UNITED STATES PATENT OFFICE

2,110,219

## METHOD OF PREVENTING OFFSET IN PRINTING

Virgil G. Green and Eric Gustafsson, Chicago, Ill., assignors to Binks Manufacturing Company, Chicago, Ill., a corporation of Delaware

Applicaton July 31, 1937, Serial No. 156,806

16 Claims. (Cl. 101—420)

The present invention relates to the art of printing and has reference more particularly to a method of preventing the occurring of "offset" or "smut" from a freshly imprinted sheet or web on a superimposed sheet or web portion. The term sheet is used herein in a general sense and comprehends a web of indefinite length.

The invention comprehends the provision of a novel method of preventing "offsetting" by the deposit of spacer particles upon the surface of a freshly printed sheet, when the ink is insufficiently dry and would smut the next imprinted sheet when superimposed upon it, by initially creating a cloud of finely divided particles, whether dry powder or liquid, from offset-preventing material at a locus above such surface, and so acting upon the cloud as to cause a spreading of and distribution of the particles of the cloud over and upon the whole surface of the sheet or the full width of a portion of a relatively moving web.

Preferably, the particles are created by the spraying of a liquid solution the solute component of which results in solid globular-like particles upon evaporation of the solvent component. The cloud is created, preferably with air under pressure, by so spraying the material to a given fineness as to momentarily hover at the locus mentioned and also as to be, preferably, of smaller horizontal area than that of the surface of the sheet to be treated. The spreading of the cloud so that it will attain as great an area as the sheet may be effected in various ways, as by blowing a stream of air or gas, heated or unheated, against the cloud, or by the movement of the successively imprinted sheet, through the locus mentioned, against the cloud, and toward the previously imprinted sheet, whereby the cloud is caused to spread and increase in area and to move toward and to the latter sheet, and the particles are caused to separate and become distributed over the whole area of the sheet or over the full width of a relatively moving web, there being a final deposit of minute and more or less widely spaced or scattered solid or substantially solid particles on the surface of the sheet.

The substance used may be any solution of a solid forming solute having a volatile solvent, such as lacquer gums, resins, cellulose esters or ethers, which are soluble in such solvents as alcohol, acetone, ethyl acetate, toluol, xylol, ethyl acetate, butyl acetate, carbon tetrachloride, etc., or may be any aqueous solution of any of the many starches or dextrins, or sugar, or dextrose, or corn starch, corn dextrin, potato starch, etc. The solvent component is preferably of such value as to substantially completely evaporate in the movement of the particles to the surface of the sheet, whereby the particles may adhere thereto or rest thereon.

Heretofore, spacer particles have been produced, for preventing offset, by the direct and continuous spraying of liquid substances over the whole area of the sheet or the whole width of a relatively movable web; in one case the liquid being a fused substance at such a temperature that the sprayed particles would congeal in transit to the surface of the paper as the heat of fusion was given up, and in another instance the liquid was a solution with a volatile solvent which evaporated during the direct travel of the spray particles to the sheet or web so that the particles would be substantially solid upon impact on the surface of the sheet or web. These involve many disadvantages and objections which are avoided and eliminated by the present invention.

To obtain such extensive distribution, with even an approximate uniformity, the spray was flattened to spread in one direction over the width of sheet, the spraying being continuous during the time in which the sheet passed lengthwise under the spray; and to obtain even a substantial vaporizing of the solvent of the solution during the short time in which the spray passes directly from the spray device to the sheet, the solvent had to be speedily vaporizable or volatile. Moreover, the solid forming ingredients suitable for use in such a volatile solution were gums, cellulose esters, or the like, so that the deposits on the sheet were of much smaller height than their horizontal dimensions.

In such prior processes the spray must be projected to cover the entire area of the sheet or the full width of the web. That required the use of a very large quantity of the liquid and a correspondingly large consumption of the compressed air necessary for producing the spray and for propelling the spray particles all the way to the sheet or web. The result is a wasting of the major portion of the material, much of which collects on the machinery to the detriment of its operation and with the necessity of frequent cleaning thereof, thus reducing the economical operation of the press.

With the direct projection of the spray against the sheet, the liquid was only subdivided to a limited extent, thereby producing the effect of a spatter coating, or of a so called stipple coating, and required a correspondingly large quantity of

the solid ingredient in proportion to the area of the sheet.

When using widely divergent spray streams, necessary in direct spraying when covering large areas, the distance travelled by the spray bodies or droplets in the inner streams will be considerably shorter than the distance of travel thereof in the side streams. In such cases the spray bodies, of the inner streams, impacting the sheet will be wet and those of the outer streams will be dry and will be wasted. Any adjustment to cure one condition whereby the spray bodies may impact the sheet with sufficient adherence for them to stick, will increase the other condition, resulting in either worse blotching or greater waste of material.

When using fused material, such as melted wax, paraffin, or the like, heat is given off as the particles congeal or solidify, which is very disagreeable and requires cooling and ventilating devices. Similarly, when using a solution of such substances, as gums, resins, cellulosic compounds, and the like, having a volatile solvent, the evaporation of the volatile solvent component of the liquid particles gives off obnoxious and disagreeable fumes and vapors which must be eliminated by ventilating and exhausting means. In both cases there is an increase in the cost of operation, and a hampering of the convenient access to the different parts of the printing machine. Moreover, the high cost of the volatile liquid used as a solvent, as compared to water, also contributes to the high operating cost of the processes heretofore used.

The present invention avoids and eliminates all those disadvantages and objections, by creating, as by way of a spraying means, a cloud of finely divided particles at a point or locus opposite or above the surface of the sheet to be covered or treated, and acting upon the cloud, as by passing another or successively printed sheet through such locus, so as to cause the cloud to move toward the surface of the sheet to be covered or treated and to spread it out so that the particles will be distributed over the entire imprinted area of the sheet. The substance used is preferably an aqueous solution of a water soluble substance having a solid forming solute component upon the evaporating of the water component. There is no projection of spray bodies for impacting the surface of the sheet. The rate of evaporation of the water component of the particles is such that the particles on reaching the surface of the sheet or web will be solid and dry or substantially solid and almost dry yet being sufficiently adherent as to stick to the sheet. The particles are globular in form and transparent or nearly so, and their size is sufficient to so space the adjacent sheets as to prevent offsetting.

Other objects, advantages, capabilities, features, process steps, and the like are comprehended by the invention as will later appear and as are inherently possessed by the invention.

Referring to the drawings, some of which show the spray and cloud schematically:

Fig. 1 is a fragmentary end elevational view of a printing press with an attachment for carrying out the invention;

Fig. 2 is a side view in elevation of the same;

Fig. 3 is a top plan view of the same, showing a mode of applying the invention;

Fig. 4 is an end view in elevation, more or less diagrammatically, for showing a stage of the process of the invention;

Fig. 5 is a similar view at another stage of operation;

Fig. 6 is a similar view at still another stage of operation;

Fig. 7 is a similar view showing the stage of creating the cloud from a laterally directed spray;

Fig. 8 is a side elevational view of a "fly" type of press and attachment for carrying out the invention;

Figs. 9, 10, 11, and 12 are views similar to Figs. 4, 5, 6, 7, showing different modes of creating the cloud and acting upon it to cause a distribution of the particles on the sheets; and,

Figs. 13 and 14 are conventional side elevational views showing the applicability of the invention to a continuously travelling web.

Referring more in detail to the drawings, the means selected to illustrate the carrying out of the invention is shown as a cylinder type of press having a cylinder C, an inclined guide 1 over which the printed sheets are successively slid as and when delivered from the cylinder C, side frames L, a reciprocating sheet feeder 2 linked to rocker arms 3 pivotally connected to the side frames L, and a delivery or receiving table T upon which the sheets pile up to form a stack S.

The invention is applicable to and adapted for use with any type of delivery means whether or not attached to a printing press. As for example printed sheets of different character which may be printed at different points and which are to be stacked in a given order, may be received in a given order on a suitable conveyor from the different printing means and then delivered for stacking. The process of this invention will apply when so delivering to the stack.

To a side frame L are fixed brackets B in which is vertically and angularly adjustably clamped a standard or riser R carrying at its upper end a container 4 for containing offset preventing material, in liquid form, and from which such material may flow by way of a duct 4a to a spray device 5. To the latter is also connected a compressed air duct A, such as a hose, leading from a suitable compressed air source (not shown).

The spray device 5 is adjustably connected to and carried by a shaft or cross bar 7, of any desired length, which is adjustably clamped in a clamping bracket 6 for both linear and rotational adjustment of the bar 7, the bracket being also vertically and rotationally adjustably clamped to the standard R. The bar as shown in Figs. 1 and 8 is short but it may be longer so that it may extend transversely over the delivery portion of the press and whereby the spray device may be adjustably located at any point along the bar at any desired point above or at the side of the delivery part of the press.

The spray device may be of the type more specifically disclosed in United States Patent #1,910,673 issued May 23, 1933 to Svend Bramsen, although any suitable spray means may be used. It preferably has the air and material valves thereof and the means for operating them so designed that the air will issue or be projected prior to and be cut off later than the projection and cutting off of the liquid material, or in other words, the air is projected for a longer interval or period of time than is the liquid material, and such longer interval includes the shorter interval during which the liquid material is projected. Such projection of the air includes the projection of a portion of the jet of air in advance of the spraying of the material, so that the advance or

leading air portion moves toward the surface of the printed sheet and is reflected or partly reflected from such surface to provide a cushion of air between the cloud and the sheet to retard the descent of the particles of the cloud by gravity, and also the reflected air portion will move against the cloud and into or partly into the cloud to assist in the spreading of the cloud or the particles thereof as also to assist in the evaporation of the solvent component; and also includes the projection of a portion of the air jet which follows or trails the sprayed material so that the trailing air portion moves toward and against the cloud and into or partly in the cloud to assist in the spreading of the cloud or the particles thereof as also to assist in the evaporation of the solvent component. That portion of the air jet between the leading and trailing portions thereof, besides acting to atomize and propel the material also acts to agitate the mist particles, to further break them up into finer particles, to assist in forming the cloud, to swirl the particles with the air whereby the evaporation of the solvent component is aided, and to partly spread the cloud to a given areal extent which is less than the area of the imprinted portion of the printed sheet. As the fluids are projected they will normally take the form of a cone but it is desirable that the same be flattened or made more or less elliptical in cross section, so that the cloud of particles, produced from the spraying or projection of the fluid, may be more or less flat. For this purpose air is projected also in the form of jets from the horns *h* at an angle to the jet of material projected from the spray device **5**, with the effect of flattening the spray stream or streams into a plane at right angles to the plane of the horn jets.

If the gun is constructed, as shown for example in the Bramsen Patent #1,910,673, for emitting air prior to emission of liquid material as also therewith, and the gun is disposed for producing a cloud of mist hovering somewhat above a horizontal surface, toward which the gun is pointed, the reflection of such earlier emitted air from that surface will retard the descent of the cloud by gravity, and also will agitate the mist particles to cause them to swirl into contact with more of the air. However; the nozzles of the gun can also be constructed and arranged, on the general principle of the Sausen and Olsen Patent #1,633,291, for mixing liquid with air before the liquid is discharged.

The invention comprehends the creation of clouds intermittently during the operation of the press, so that a cloud will appear at a locus above the stack S or stack supporting table T and in the path of movement of the printed sheets as they are delivered from the cylinder C to the stack S. This locus is preferably at or just below the point where the delivered printed sheet starts to "air-drop" to the stack S, whether delivered slidably by the feeder **2** (Figs. 1 and 2), or by the swinging "fly-rack" **12** shown in Fig. 8. Therefore, the liquid material is projected in the form of puffs, from the spray device **5**, into the air above the stack S, whereby, by reason of the resistance of the atmospheric air, and the action of the compressed air jet projected from the spray device **5**, the liquid is broken-up into very fine or minute liquid particles to form a sort of cloud which momentarily hovers over and in spaced relation to the stack S.

For the intermittent operation of the spray device **5** mentioned, a suitable electro-magnetic valve operating device **9** is connected to and carried by the spray device **5**, as shown, the device **9** being electrically connected by way of conductors or wires W to a switch or interrupter device **10** fixed to a frame part L, the interrupter device **10** being of any suitable construction. To the interrupter **10** is connected a dog **10***a* which is intermittently operated by a trip arm **3***a* fixed to the shaft of the angularly movable feeder operating arms **3** (Figs. 1 and 2) or "fly-rack" **12** (Fig. 8). As the trip arm **3***a* is angularly moved it so operates the dog **10***a* or **11** as to first close the electric circuit to the valve operating device **9** and then to open the circuit. The duration of time the valves are open and the fluids are projected is for but a fraction of a second and may be varied as desired depending upon the character and the extent of the cloud needed for the particular sheets being printed. The instant at which this operation is effected is so timed with relation to the interval between the delivery of a sheet from the cylinder C and the start of the air dropping of the sheet above the stack as to obtain the desired cloud at the locus mentioned above by the time the delivered printed sheet arrives at that locus.

An important feature of the invention is the producing of a cloud of particles of much smaller horizontal area than that of the sheet to be ultimately covered by the particles after the cloud has been acted upon to increase in area, so that it becomes as extensive as the surface of the sheet at the instant the particles reach the sheet.

The horizontal extent or area of the cloud is less than or only a fraction of the extent or area of the printed sheet, as is clearly shown in Figs. 4, 9, 10, 11, and 12, wherein the cloud M is shown at the locus of creation and preferably at a spaced point above the top sheet of the stack S. Upon the arrival of the successively printed sheet F at said locus and just above the cloud M, or even in the cloud, the sheet F starts to "air-drop". As it descends it flattens out the cloud so as to increase its horizontal extent or area, as shown by the cloud $M^1$ in Fig. 5. By the time the sheet F arrives adjacently to the top sheet of the stack **7**, the cloud has so spread out and been squeezed between the two sheets mentioned as to completely cover and spread over the entire extent or area of the top surface of the top sheet of the stack **5**, and also over the whole area of the bottom surface of the sheet F. The particles will stick in spaced relation on those surfaces and will act as "spacer-particles" to so maintain the adjacent sheets spaced as to prevent "offsetting."

To accomplish the objects of the invention, the spray may be projected in any one of various directions. In Figs. 1, 2, and 3, the direction is shown as downwardly at an angle to the vertical and componently from the side of the press and componently toward the stacking end of the press. This is convenient because the spray device, in general, may be located at the side of the press where access to the press and its operation is not interferred with.

However, if desired, the projection of the spray may be effected vertically downwardly over the stack, as shown in Fig. 9, (which is either an end or side elevational view of the device); or downwardly rearwardly, or forwardly as shown in Fig. 10 (a side elevational view); or laterally horizontally as shown in Fig. 7, or forwardly horizontally as shown in Fig. 11 (side elevation of stack end of press), or upwardly and either lat-

erally or forwardly as shown in Fig. 12, (being either a side or end elevational view).

In any of these cases, the cloud or mist preferably is created at a locus spaced from the top sheet of the stack S and the succeeding printed sheet F is brought to that locus, preferably just above the cloud, and then air drops to push down the cloud and to sequeeze it so that it becomes horizontally extended to cover and spread over the whole area of the sheet, as shown by way of illustration by the position $F^1$ of the "air-dropping", the cloud $M^1$ being shown as flattened out between the sheet $F^1$ and the top sheet of the stack S. In some cases the sheet may be delivered from the delivery means at a slightly lower level, as indicated at $F^2$, where the sheet enters in the midst of the cloud, the air dropping of the sheet $F^2$ causing a spreading out of the cloud portion beneath, as in the cases explained above, and drawing on the cloud portion above it whereby the particles thereof may spread on the top of this sheet and mix with the particles of the lower portion of the next created cloud when moved down by the next printed sheet.

In the case of applying the cloud to a continuously travelling web, the cloud $M^3$ (see Fig. 13) may be drawn down by the air being dragged on the top surface of the travelling web, this being aided by any superposed surface, such as a board B, so disposed as to cause a movement of the dragged cloud downwardly upon the surface of the web, and to flatten it out at the locus $M^4$ whereby the particles are distributed over and deposited on the surface of the web W which passes over the roller R.

In Fig. 14 is shown a travelling web W passing over a roller R, and the creation of a cloud M, which is flattened down and horizontally increased in area by a downwardly projected air stream A the function of which is similar to the air-dropping of a sheet as described above in connection with the other figures of the drawings.

As the cloud is reduced in thickness and increased in area between the relatively approaching sheets, the particles, which are being converted into solids by the evaporation of the solvent component thereof, will not only stick to the upper surface of the perviously printed or last stacked sheet but some of the particles also will stick to the under surface of the next or successively printed sheet which is acting on the cloud in its approach t. the last stacked sheet.

This is considered as an improvement on the invention disclosed in our copending application Serial No. 51,742, filed November 27, 1925.

While we have disclosed an illustrative means for carrying out the invention and a few modes of operation thereof it is to be understood that the invention is not limited thereto but comprehends other features, modes of carrying out the process, process steps, and the like without departing from the spirit of the invention.

Having thus disclosed the invention, we claim:

1. A method of preventing offsetting in printing comprising the steps of creating a cloud of finely divided particles from offset eliminating material at a locus above the surface of a previously printed sheet, and so acting on said cloud as to cause it and the particles thereof to spread over at least the whole area of the imprinted surface portion of the printed sheet.

2. A method of preventing offsetting in printing comprising the steps of spraying an offset preventing material in fluid condition for a given interval of time, projecting a jet of air therewith for a greater interval of time and including the spraying interval of time, so as to produce a cloud of finely divided particles at a locus above the surface of a previously printed sheet and with an areal extent less than the area of the imprinted portion of said sheet, and so moving a successively printed sheet through said locus as to cause a lateral extension of said cloud and to cause the particles thereof to spread at least over the entire area of the imprinted surface portion of the printed sheet.

3. A method of preventing offset in printing during the delivery of consecutively imprinted sheets, comprising the momentary puffing of a finely atomized spray of offset preventing material with air in a direction toward the imprinted surface of a delivered sheet and with insufficient force to cause an impact of the particles upon said surface so as to effect a cloud of finely divided particles at a locus spaced from said surface, and projecting additional air to act against said cloud to cause a spreading of said cloud to an extent sufficient to at least cover the whole area of the imprinted surface portion of said delivered sheet.

4. In a method of preventing offset by the deposition, upon an imprinted sheet, of particles of offset preventing material, the steps of producing a fine misty cloud of the said material which cloud hovers temporarily above the said sheet; and of projecting air against said hovering cloud and toward the said sheet, for increasing the area of the cloud in a plane substantially parallel to said sheet.

5. A method of preventing offset in printing by the production of spacer particles of offset eliminating material upon the printed surface of a sheet, comprising the creating of a cloud of fine particles from offset eliminating material of an areal size in a plane parallel to the sheet smaller than the area of the sheet, and so acting against said cloud as to move it toward said sheet and to increase its areal size so that the particles thereof will be distributed over the entire area of said sheet.

6. The method of preventing offset between imprinted sheets which are stacked by consecutively dropping the sheets upon one another from a predetermined drop position, by the depositing, upon a newly printed sheet, of microscopic spacer particles, which consists in producing a fine misty cloud of said particles in liquid condition above the said sheet, and evaporating substantially all of the liquid content of said particles by successively subjecting said particles to compressed air projected against said cloud and to the movement of the air which is squeezed out between said newly printed sheet and the next dropped sheet during the descent of the latter.

7. A method of preventing offset between consecutively printed and thereafter stacked sheets, comprising the steps of transforming a quantity of a liquid, containing a solid forming material suitable for sheet-spacing particles, into a misty cloud spaced from and opposite only a substantially central portion of a freshly imprinted sheet, and thereafter flattening the said cloud to spread it over the entire area of the sheet.

8. A method of preventing offsetting in printing comprising the steps of spraying an offset preventing material in a fluid condition for a given interval of time, projecting a jet of air therewith for a greater interval of time and including the spray interval of time so as to pro-

duce a cloud of finely divided particles at a locus above the surface of a previously printed sheet and with an areal extent less than the area of the imprinted portion of said sheet, said projecting of said jet of air including the moving of a portion of the air in advance of the sprayed material, which is partly reflected from the surface of the printed sheet to form a cushion of air between said sheet and said cloud to retard the descent of the cloud by gravity, and so moving a successively printed sheet through said locus as to cause a lateral extension of said cloud and to cause the particles thereof to spread at least over the entire area of the imprinted surface portion of the printed sheet.

9. A method of preventing offsetting in printing comprising the steps of spraying an offset preventing material in a fluid condition for a given interval of time, projecting a jet of air therewith for a greater interval of time and including the spray interval of time so as to produce a cloud of finely divided particles at a locus above the surface of a previously printed sheet and with an areal extent less than the area of the imprinted portion of said sheet, said projecting of said jet of air including the movements of portions thereof in advance of and trailing said sprayed material whereby the advancing air portion is partly reflected from the surface of the printed sheet and moves against and partly into said cloud to retard its descent by gravity, and the trailing air moves against and partly into said cloud to assist in spreading said cloud, and so moving a successively printed sheet through said locus as to cause a lateral extension of said cloud and to cause the particles thereof to spread at least over the entire area of the imprinted surface portion of the printed sheet.

10. A method of preventing offsetting in printing comprising the steps of spraying an offset preventing material in a fluid condition for a given interval of time, projecting a jet of air therewith for a greater interval of time and including the spray interval of time, so as to produce a cloud of finely divided particles at a locus above the surface of a previously printed sheet and with an areal extent less than the area of the imprinted portion of said sheet, said projecting of said jet of air including the movement of a portion of said air toward said sheet to provide a cushion of air between said sheet and said cloud so as to assist in the spreading of the cloud, and so moving a successively printed sheet through said locus as to cause a lateral extension of said cloud and to cause the particles thereof to spread at least over the entire area of the imprinted surface portion of the printed sheet.

11. A method of preventing offsetting in printing wherein imprinted sheets are consecutively dropped to form a stack, comprising the steps of spraying a solution of a solid forming offset preventing material for a given interval of time, projecting a jet of air therewith for a greater interval of time and including the spraying interval of time, to produce a cloud of finely divided particles at a locus above the surface of a previously printed sheet and with less spread than the imprinted surface portion of said sheet, said projecting of said jet of air including the moving of a portion of air in advance of the sprayed material which is partly reflected from the surface of said sheet against and into said cloud to assist in evaporating the solvent component of the particles thereof, and moving the next sheet against said cloud to spread it over the imprinted surface portion of said previous sheet.

12. A method of preventing offsetting in printing wherein imprinted sheets are consecutively dropped to form a stack, comprising the steps of spraying a solution of a solid forming offset preventing material for a given interval of time, projecting a jet of air therewith for a greater interval of time and including the spraying interval of time, to produce a cloud of finely divided particles at a locus above the surface of a previously printed sheet and with less spread than the imprinted surface portion of said sheet, said projecting of said jet of air including the moving of a portion of air in advance of the sprayed material for reflection from the surface of said sheet against and into said cloud and the moving of a portion of air consecutively of the sprayed material against and into said cloud to assist in evaporating the solvent component of the particles thereof, and moving the next sheet against said cloud to spread it over the imprinted surface portion of said previous sheet.

13. A method of preventing offsetting in printing wherein imprinted sheets are consecutively delivered to form a stack, comprising the steps of intermittently projecting a fine spray of offset preventing material into the form of a cloud above the last stacked sheet, projecting a jet of air in advance of and with each spray of material to provide a cushion of air in advance of said cloud for assisting in spreading said cloud, and moving the next sheet against said cloud to spread it over the imprinted surface portion of said last stacked sheet.

14. A method of preventing offsetting in printing wherein imprinted sheets are consecutively delivered to form a stack, comprising the steps of intermittently projecting a fine spray of offset preventing material into the form of a cloud above the last stacked sheet, of less spread than the imprinted surface portion of said last stacked sheet, projecting a jet of air in advance of and with each spray of material to provide a cushion of air in advance of said cloud for assisting in spreading said cloud, and moving the next sheet against said cloud to spread it to the extent of covering the whole area of the imprinted surface portion of said last stacked sheet.

15. A method of preventing offset in printing, comprising the steps of creating a cloud of finely divided particles from offset preventing material at a locus opposite a face of a previously printed sheet in a compass of less areal extent than the area of the imprinted surface portion of the sheet, and then spreading said cloud to a larger compass so as to spread the particles thereof over the imprinted surface portion of the printed sheet.

16. A method of preventing offset in printing which comprises the steps of creating a cloud of fine particles from offset preventing material in a small compass above a printed sheet, and then increasing the compass of said cloud sufficiently to cover the imprinted surface portion of the printed sheet.

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