

Oct. 15, 1935.

W. K. MILLER

2,017,631

METHOD AND MEANS FOR PRINTING

Filed April 28, 1931

2 Sheets-Sheet 1

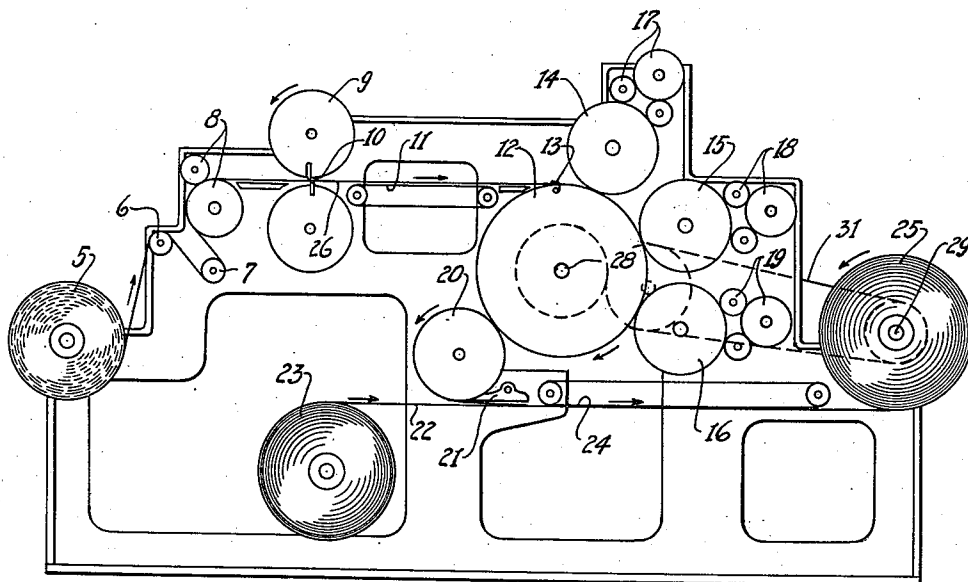


Fig. 1

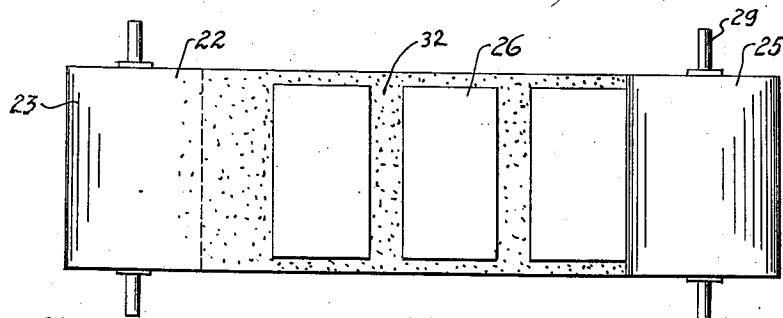


Fig. 2

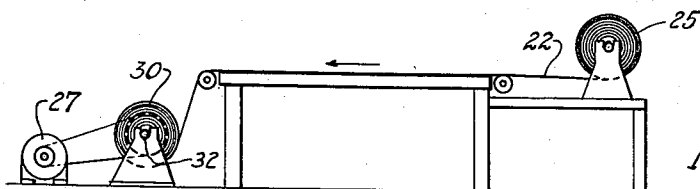


Fig. 3

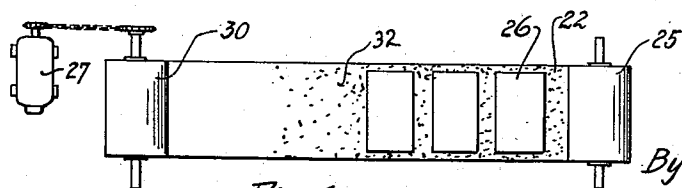


Fig. 4

INVENTOR:
Walter K. Miller
By *E. J. Andrews*
Att'y.

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2 Sheets-Sheet 2

Fig. 5.

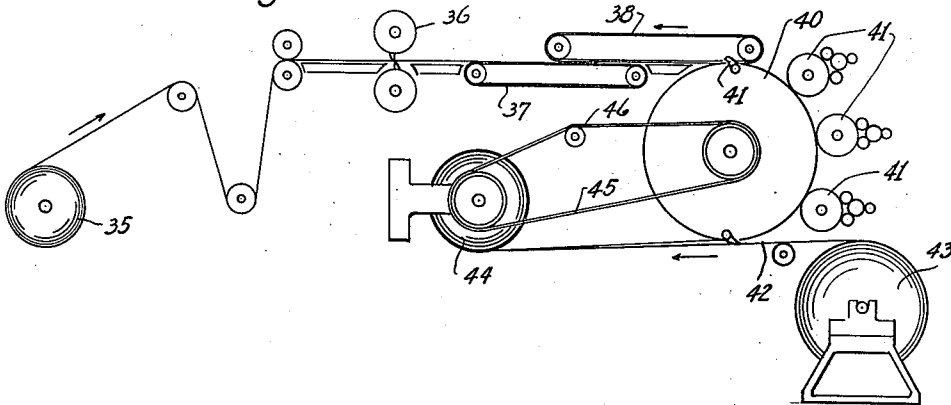


Fig. 6.

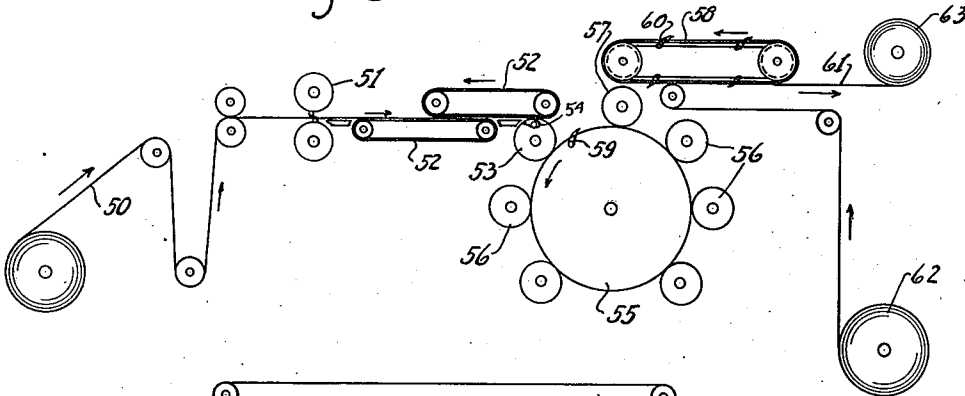
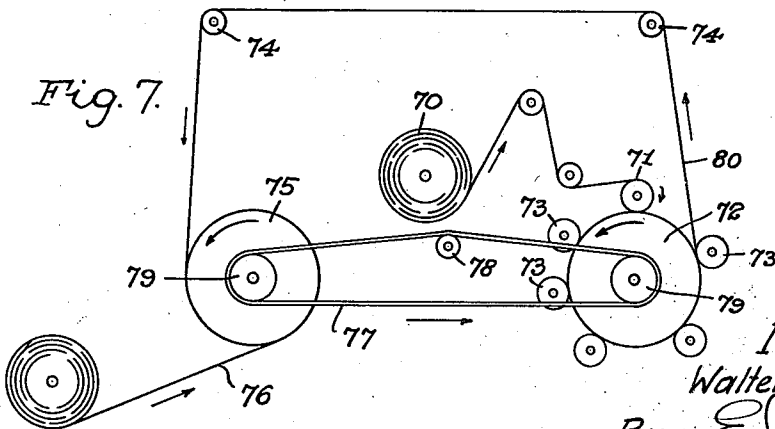


Fig. 7.



INVENTOR:
Walter K. Miller
By *E. J. Andrews*
Att'y.

UNITED STATES PATENT OFFICE

2,017,631

METHOD AND MEANS FOR PRINTING

Walter K. Miller, Chicago, Ill.

Application April 28, 1931, Serial No. 533,472

12 Claims. (Cl. 101—420)

This invention relates to methods and means for printing, and particularly to means for preventing offsetting of the ink from printed sheets onto backs of the adjacent sheets. A particular object of the invention is to provide a method and means for preventing off-setting of the ink on the printed material by the use of especially prepared granular surface smut strips and, at the same time, providing for using the smut strips over and over again.

My method is particularly valuable in printing on transparent sheets, such as the relatively non-absorbent transparent cellulose sheeting known in the market as "Cellophane", as the off-setting then is more objectionable as it shows not only on the back of the sheet but also through the sheet itself. My invention consists in using continuous smut strips, strips which are not cut up into short sheets, comparable with the printed sheets and, hence, which assist in supporting and guiding the printed sheets; and after the printing of the sheets, the smut strip is rolled into rolls with the printed sheets or strips superimposed thereon, and the combined sheets and strips are then dried and separated and the smut strips are used over again for a similar purpose, the smut strip or web being provided with a hard granular material such as sand to maintain the printed matter in spaced position to provide for proper setting or drying. The strips may thus be used over and over again until they have become unfit from use.

Of the accompanying drawings, Fig. 1 is a diagrammatic elevation of a printing machine suitable for carrying out my method and embodying the principles of my invention; Fig. 2 is a plan view of the smut web 22 being wound with the printed sheets 26 superimposed thereon; Fig. 3 is an elevation of apparatus which may be used during the separating process after the sheets are dried; Fig. 4 is a plan view of the mechanism of Fig. 3; and Figs. 5, 6 and 7 illustrate modified forms of the application of the invention.

As stated, the drawings herein are largely diagrammatic, as it is to be understood that the exact details of the mechanism are not a necessary part of my invention. For simplicity and clearness of illustration, I have omitted various portions of the mechanism of the machine, and those portions which are shown are neither strictly drawn to scale nor in the exact form that would be used in practice, it being understood that, so far as my invention is concerned, both

the process and the means for carrying it out are sufficiently illustrated in this manner.

Referring to Fig. 1, 5 indicates a roll of paper which is to be cut into sheets of suitable length and to be printed. While the paper which is more particularly referred to is transparent, such as cellophane, yet, the invention is applicable to paper of any nature which it may be desired to print. The strip of paper passes from the roll 5 in the direction of the arrow, over the idle roller 6, the tension roller 7, and between the feed rollers 8, to the cutting cylinder 9 which, by means of knives 10, cut the strip into suitable lengths for printing. The sheets 26 thus formed then pass over the feeder tapes 11 to the impression cylinder 12 where they are gripped by the grippers 13 and carried between the impression cylinder 12 and the plate cylinders 14, 15 and 16, in the direction of the arrow. The impression cylinder is mounted on a shaft 28.

A particular use of my invention is in printing several colors and, for this purpose, I provide the plate cylinders 14, 15 and 16, each being supplied with its own colored ink, by means of the inking rollers 17, 18 and 19. After being printed, the sheets pass between the transfer cylinder 20 and the impression cylinder, and are removed from the transfer cylinder by the fingers 21 playing in grooves in the cylinder in an ordinary manner. The fingers 21 and grippers may be of any suitable form.

As the printed sheets are removed from the transfer cylinder 20, they pass downwardly onto a web 22 of granular surfaced smut paper, which is being unrolled from the roll 23. The smut web with the printed sheets superimposed thereon passes under the tapes 24, and the web is rewound into a roll 25 mounted on a shaft 29, with the printed sheets 26 superimposed thereon.

The combined rolls of paper are then placed in a suitable room for drying, so that the ink will no longer smut the paper, and the roll is then rewound as indicated in Figs. 3 and 4, and the printed sheets 26 are removed from the web as the strip is being rewound into the roll 30 which corresponds to the roll 5 and which may be used over again, as hereinabove described.

It will be understood that suitable operating means, such as an electric motor, may be used for operating the different rollers and cylinders, the motor being operatively connected in any suitable manner to the shaft 28 and to shafts of the various rollers and cylinders. Belts 31, for instance, may be used. The roll 30 may be

wound on the shaft 32 which is operatively connected with the motor 27.

It will thus be seen that I have provided a method for protecting the printed sheets 26 from smutting, by means of smut strips or webs which are not materially injured by the operation and, hence, may be used over and over again. While I have illustrated and described my invention as consisting in winding the printed sheets 26 with the granular surfaced smut web, then drying the rolls, then unwinding, separating the sheets and rewinding the web, yet, it is to be understood that the particular manner of separating the sheets from the web, when the combined rolls are unwound, is not a part of my present invention. This operation may be performed manually or automatically, as may be desired.

In accordance with my invention there is employed as a smut sheet a continuous web of a material in the nature of sandpaper which has a coating of sand or some other suitable finely granulated material on the side of the web which receives the printed sheets. The granulated material supports the printed sheets and holds the printed surface slightly away from the surface of the web, so that there is no tendency of the ink smudging on the surface of the printed sheet, or of the web itself; and this is particularly desirable in case of any slight shifting of the printed sheet relative to the web surface. By holding the printed surface away from the adjacent surface, space obviously is provided for permitting molecular movement of gases within the composite roll and drying or setting of the relatively slow drying ink. When the printed sheets superimposed on the web are rolled on the various cylinders or rollers, there is a tendency for a slight shifting of one surface on the other. With sandpaper, however, this produces no undesirable effect, and it also tends to reduce the relative shifting tendency of the adjacent surfaces.

As shown in Figs. 2 and 4, the smut sheet is composed of a continuous web 22 which is provided with a coating or surface of sand which is adapted to receive the freshly printed material in the manner described.

Fig. 5 shows a somewhat modified form of machine for accomplishing substantially the same purpose as is accomplished with the machine of Fig. 1. In this case, the roll of paper 35 provides the strip to be printed, which is cut into suitable lengths by the cutting cylinders 36 and then passed onto the feeder tapes 37 and 38 to the impression cylinder 40 by means of the grippers 47. These grippers may be of any ordinary or suitable form. The sheets are then printed by means of the plate cylinders 41 and are passed onto the sandpaper strip 42 which is provided by the roll 43. The sandpaper strip, with the printed sheets superimposed thereon, is then rolled up on the roller 44 and is then cared for in any ordinary and suitable manner. For instance, in a manner such as is described hereinabove with reference to the mechanism of Fig. 1. One difference between the mechanism of Figs. 1 and 5 is that the transfer cylinder 20 of Fig. 1 is omitted from the mechanism of Fig. 5; the printed sheets being passed directly onto the sandpaper strip 42.

Fig. 6 shows a further modification of the machine for using smut webs in conjunction with printed sheets which are cut from strips. In this case, the strip 50 to be printed, as before, is cut by knife cylinders 51. By means of feeder tapes 52 and grippers 54, the sheets are passed onto

the transfer cylinder 53 and, by means of grippers 59, onto the impression cylinder 55. This cylinder rotates in the direction of the arrow, and a plurality of plate cylinders 56 print various colors on the sheets. The sheets are then removed from the impression cylinder by the transfer cylinder 57 to delivery chains 58 having grippers 60 thereon. The sheets are then passed onto the sandpaper strips 61, passing from the roll 62, and are wound onto the roller 63.

In case of Fig. 1, the printed cut sheets are delivered onto the sandpaper strips by the transfer cylinder 20, at a speed equal to the speed of the moving strip, so as to prevent any relative movement between the two surfaces when they come together. However, inasmuch as the roll 25 during operation is continually increasing in size, it is obvious that, under ordinary circumstances, the speed of the strips increases as the operation proceeds, while the speed of the printed sheets remains uniform. Any suitable means may be used for synchronizing the speed of the two sheets as they come together, but I prefer for the purpose using a loose belt 31 for operating the roll 25. By providing for slippage between the belt 31 and shaft 29, as is well understood in the art, the speed of both of the sheet surfaces can be maintained constant. Any ordinary means may be used for this purpose, and such means are no part of my invention.

Similarly with the apparatus of Fig. 5, which illustrates somewhat the operation of the two rollers by the use of a loose belt. The driving belt 45 is maintained more or less tight by means of the idle pulley 46 which, by suitable breaking means acting on the periphery of the roll 44, maintains uniform speed of the strip 42 equal to that of the sheets which are being printed as they come together.

Suitable somewhat similar means may be used for maintaining equal the speeds of the sheets and the sandpaper, in case of the apparatus of Fig. 6.

Fig. 7 illustrates the use of the sand paper web with printed strips which are not cut but are rolled as a whole together with the sandpaper. In this case, the strips to be printed pass from the roll 70 to the feed cylinder 71 and then onto the impression cylinder 72, where it is moved in the direction of the arrow and printed by the plate cylinders 73. After being printed, the strip is carried over the rollers 74 to the roll 75, where together with the sand paper strip 76 the two strips are formed into a roll with the printed surface facing the roughened surface of the sandpaper, thereby providing air spaces adjacent the freshly printed strip for air circulation and consequent drying.

In this case also, a loose belt 77, having an idler 78, plays on flange pulleys 79, and the speed of the two strips is thus maintained constant. As the roll 75 increases in size, the printed strip 80, by means of suitable braking mechanism acting on the roll 75 or otherwise, maintains constant the speed of the printed strip 80. Inasmuch as the two strips are ultimately rolled together on the same roller 75, the speed of the strips as they come together is necessarily the same, so that any variations between the periphery speed of the impression cylinder 72 and that of the roll 75 is immaterial, at least so far as the coaction of the printed strip and the sandpaper strip are concerned.

In this case, it is particularly desirable to use the strips with the granulated material thereon

as, in rolling the two long continuous strips together, the tendency of the adjacent surfaces of the strips to shift slightly relative to each other is increased. But, with the use of the granulated material, any injurious results from this shifting are eliminated, the relatively short path of travel of the sandpaper web as compared with the relatively long path of travel of the printed material, as shown in Fig. 7, for example, assisting in this respect.

I claim as my invention:

1. The process of preparing sheet cellulose material comprising printing upon a web of such material and drying the same by winding the material into a roll with an intermediate flexible sanded sheet, the projecting points of the sand contacting with and spacing the printed surface of the web, and permitting air to penetrate the convolutions of the roll.

2. The process of preparing a web of material of the character described comprising printing upon a surface thereof and before drying winding said material simultaneously with a web having a sanded surface in contact with the printed surface, into a roll, the said web with a sanded surface permitting air to circulate through the convolutions of the roll.

3. The method of drying a freshly printed web of cellophane or the like, comprising rolling it up, while the imprints thereon are damp, simultaneously with a web of material having a gritty surface adjacent the imprints, said gritty surface allowing space for ventilation in the roll, and then leaving the roll intact until the imprints have dried.

4. The method of drying a freshly printed web which comprises rolling up the web in conjunction with a web of material having a gritty surface, which surface contacts with the printed face of the printed web and allows space for circulation of air within the roll, and thereafter allowing the rolled up web to dry.

5. The method of drying a freshly printed web of comparatively non-absorbent material comprising rolling up the web in conjunction with a web of very fine sandpaper, the sanded face of which contacts with the printed face of the printed web whereby the inked designs on the printed web are spaced from the adjacent convolutions in the roll so that air can circulate in the roll, thereafter removing the compound rolled-web, allowing it to dry for a number of hours, and thereafter unrolling the compound roll, and re-using the sandpaper web on a similar subsequent operation.

6. The method comprising printing designs by super-imposed impressions of different colors on a continuous web of material and receiving such web as delivered from the printing machine and rolling it up as fast as delivered in conjunction with a web having a gritty face which lies against the printed designs and provides spaces within the roll adjacent the designs so that air can circulate between the convolutions to dry the ink within a reasonable time, and thereafter allow-

ing the designs to dry while in such composite roll.

7. The process of preparing material of the character described comprising printing upon a surface thereof and before drying winding said material simultaneously with a web having a gritty surface in contact with the printed surface, into a roll, said gritty surface allowing space for ventilation in the roll.

8. A method of producing printed relatively non-absorbent cellulose sheeting, which comprises depositing a design of a relatively slow drying color on a web of said sheeting traveling at a substantially uniform rate, winding said web together with a web of sandpaper to form a composite roll, regulating the rate of winding of said two webs as said roll increases in size, maintaining said webs in roll form for a period of time sufficient for the drying of said color, and then unwinding and separating said webs.

9. The method of producing printed relatively non-absorbent sheeting, which comprises depositing a design of a color on a web of said sheeting, winding the freshly colored web together with a second web having a hard granular surface of a character to maintain the freshly deposited color in spaced relation with respect to both of said webs to permit said color to set without smearing, thereby forming a composite roll, maintaining said webs in roll form for a period of time sufficient for the setting of said color, and unwinding and separating said webs.

10. The method of producing printed non-absorbent sheeting, which comprises producing a series of deposits of relatively slow drying ink on a web of sheeting traveling at a substantially uniform speed over a relatively long path of travel, winding said web together with a web of sandpaper traveling over a relatively short path of travel to form a composite roll, regulating the rate of winding of said webs as said composite roll increases in size, maintaining said web in roll form for a period of time sufficient for the setting of said ink, and unwinding and separating said webs.

11. A method of preventing smutting of ink on printed sheets, which comprises printing on a thin pliable strip of material, passing the strip while the ink is wet on to smut strips having a facing of a granular substance such as sand positioned between the freshly printed surface and the smut strip, rolling the two superimposed strips together in a roll, and then separating the two strips when the ink is dry.

12. A method of preventing smutting of ink on printed sheets, which comprises printing on thin pliable strips of material, passing a plurality of said printed strips while the ink is wet, onto a smut strip having a facing of a granular substance such as sand positioned between the freshly printed surfaces and the smut strip, rolling the superimposed strips together in a roll, and then separating the strips when the ink is dry and employing said smut strip again in a similar manner with other printed strips.

WALTER K. MILLER.