

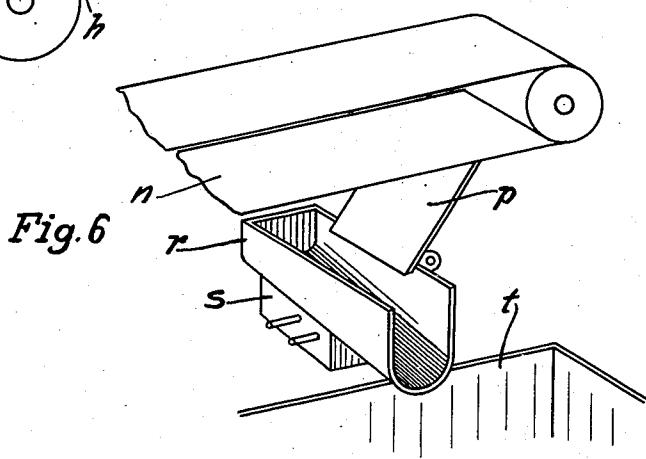
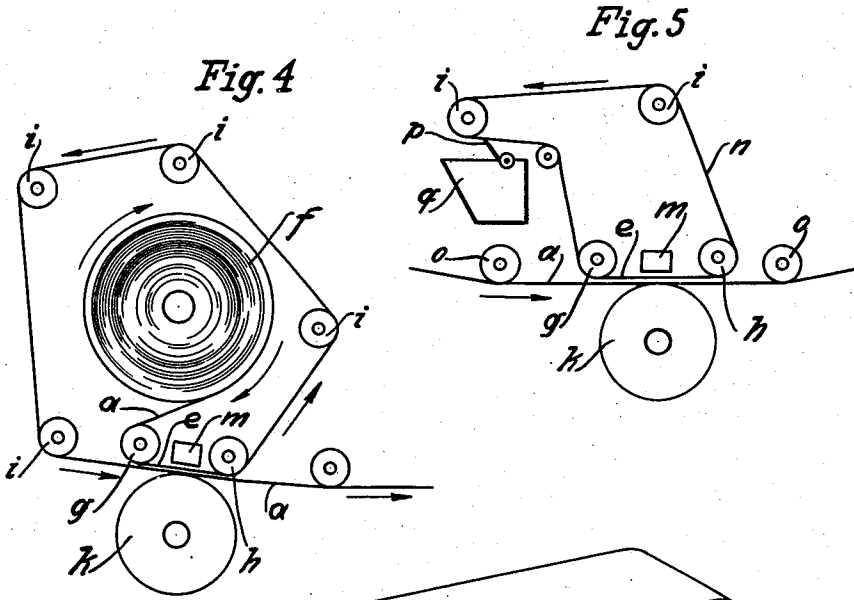
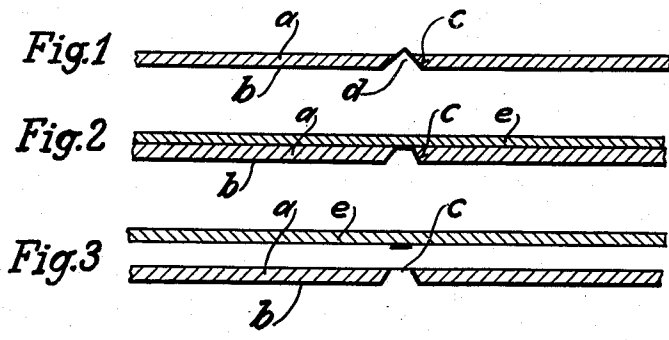
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MANUFACTURE OF CARBON PAPER

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MANUFACTURE OF CARBON PAPER

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8 Claims. (Cl. 91-48)

This invention relates to improvements in the manufacture of carbon paper and more particularly to carbon paper which is intended to be used for one copy only.

5 In the manufacture of carbon paper which is used once only it is desirable to use a paper web of cheap quality. Hitherto thin paper webs of cheap quality could not be used for the manufacture of carbon paper because such webs are
10 much too porous. When using these paper webs for the manufacture of carbon paper, it is found that the colouring material is pressed through to the rear side of the paper sheet and forms numerous little craters filled with colouring material, so that the sheet so produced cannot be
15 used for satisfactory reproduction. Moreover the guide rollers used in the manufacture of the paper sheet are soiled by the colouring material and continually return this material to the rear
20 of the sheet.

According to the invention carbon paper is produced from a thin porous paper web, by arranging on the rear side of the paper web to be converted into carbon paper and at a point
25 where the colouring roller is in contact with the paper web, a supporting surface which is kept in motion and removes the colouring material that has been pressed through the pores of the web.

Two modes of execution of the present invention are shown by way of example together with specific features of a porous sheet impregnated with colouring material.

In the accompanying drawing:

35 Fig. 1 is a magnified cross-sectional view of a flimsy paper sheet in which the coloring material has been pressed through a pore space.

Figs. 2 and 3 are similar magnified cross-sectional views of the supporting moving surface in proximity to the stock which has been supplied
40 with the coloring material, and the removal of coloring material that has penetrated to the rear side of the stock.

Fig. 4 is a diagrammatic elevational view showing the arrangement of stock supply, guide rollers and inking rollers in the modification where-
45 in the stock acts as its own supporting surface.

Fig. 5 is a view similar to Fig. 4 in which the supporting surface comprises an endless band independently of the paper stock.

50 Fig. 6 is a showing in perspective of the association of the scraper element with the supporting surface and containers into which the excess color material is caused to flow.

In a more detailed consideration of the drawing, Figure 1 shows diagrammatically the ef-
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fect of the application of colouring material to a thin porous paper web. In this figure, *a* is the paper sheet and *b* the layer of colouring material. Experiments have shown that at the pores *c* the colouring material is pressed through
5 to the rear surface of the sheet. The colouring material fills the craters *d* and soils the guide rollers for advancing the paper sheet.

Figures 2 and 3 show diagrammatically the result obtained by means of the present invention.
10 A supporting surface *e* is arranged at the rear of the paper sheet *a* in the immediate vicinity of the impregnating or colouring roller. The supporting surface *e* is constantly moved away from the impregnating area and thus removes
15 the colouring material that has been passed through the pores *c*. A satisfactory removal by the supporting surface of the colouring material that has been pressed through the pores is of considerable practical importance, since a regular
20 output and economical manufacture of carbon paper from a porous paper web of cheap quality are possible only if the supporting surface operates automatically and remains in good working
25 order.

Figure 4 shows an arrangement in which the paper web *a* to be converted into carbon paper is itself used as the supporting surface. The sheet of paper web *a* on being unrolled from the roll *f* passes in the direction of the arrows over the
30 guide rollers *g*, *h* and the area of the sheet between these two rollers serves as supporting surface *e* for the removal of colouring material that has been pressed through the pores of the sheet. The sheet *a* then passes over further guide
35 rollers *i*, arranged circumferentially in the proximity of roll *f*, and finally it passes between the supporting surface *e* and the impregnating roller *k* where it becomes impregnated with colouring material. The supporting surface *e* may be provided with a heating device *m*, which heats this
40 surface to a moderate extent and thus facilitates the removal of colouring material by said surface. The above arrangement has the advantage that no independent supporting surface for
45 the paper sheet is required.

In the arrangement of Figure 5 the supporting surface is formed by an endless band *n*. This band circulates on rollers *i* and forms between guide rollers *g*, *h*, a supporting surface *e*. It
50 may be provided with a heating device *m*, as in the arrangement of Figure 4. The paper sheet *a* which has to be impregnated is fed by guide rollers *o* and advances between the impregnating roller *k* and the supporting surface *e*, where it
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is impregnated with colouring material. The endless band n is preferably provided with a cleaning device for the removal of colouring material taken up by the supporting surface e .

5 This device consists substantially of a scraper p , beneath which a container q is arranged which collects the colouring material which is scraped off. In the arrangement shown in Figure 5 the container q is comparatively large, as the amount
10 of colouring material which is pressed through the pores is considerable.

Generally the supporting surface for the paper web will be a flat surface, as shown in the accompanying drawing, so that a sufficient area of
15 contact is available to enable the supporting surface to take up the colouring material without injuring the fragile paper web, but it is conceivable that the endless band might be so modified in order to accommodate it in a limited space,
20 that it becomes cylindrical and assumes in fact the aspect of a large roller which considerably exceeds in size that of an ordinary pressure roller. A supporting surface which is cylindrical is however less advantageous for the removal of
25 colouring matter owing to insufficient contact with the paper web. It is essential that the large excess of colouring matter on the rear of the paper web should be removed completely in order to secure an even and faultless production of the
30 carbon paper. The collection of the colouring material which is pressed through to the rear of the paper web is necessary also for economical reasons. In the above arrangement the container for collecting the colouring material would
35 be of small dimensions and it would be provided with a heating device so that the colouring material is immediately converted into a thin liquid. This small container or the bottom of this container has an inclined position, so that the liquid
40 colouring material can readily flow into a larger container for collecting the colouring material.

Figure 6 shows an arrangement in which a small container r is used for collecting the excess of colouring material. The scraper p removes the colouring material from the supporting
45 surface and passes it into the container r . The latter is arranged in an inclined position and is provided with a heating device s which keeps the colouring material in a liquid condition, so that the colouring material readily flows
50 into a larger container t .

While I have described my invention in accordance with preferred embodiments, it is obvious that many changes and modifications may be made without departing from the spirit of the
55 invention as defined in the following claims.

What I claim and desire to secure by Letters Patent of the United States is:

1. An apparatus for manufacturing carbon paper from a thin porous paper web comprising
60 in combination with a coloring roller, guide rollers positioned adjacent to said coloring roller and so arranged with respect thereto that any material advancing over the said guide rollers forms a supporting surface for the paper web contacting the coloring roller; a material adapted for removing coloring material, means for advancing the said material over the said guide rollers, and means for contacting one side of the

paper web with the coloring roller at the same time that the other side of the web is in contact with the said supporting surface.

2. An apparatus for manufacturing carbon paper from a thin porous paper web comprising
5 in combination a coloring roller, guide rollers positioned adjacent the said coloring roller and so arranged with respect thereto that the paper web advancing over the said guide rollers forms a supporting surface for the web contacting the
10 coloring roller, means for unrolling the paper web and for advancing the web over the said guide rollers to form the said supporting surface, means for further advancing the paper web and returning the same between the said supporting
15 surface and coloring roller so that one side of the said further advanced web is in contact with the supporting surface formed by the advancing paper web while the other side is in contact with the coloring roller.

3. The apparatus as in claim 2 in combination with means for heating said supporting surface.

4. An apparatus for manufacturing a carbon paper from a thin porous paper web comprising
25 a coloring roller, guide rollers positioned adjacent to said coloring roller and so arranged with respect thereto that any material advancing over the said guide roller will form a supporting surface for the paper web contacting the coloring roller, an endless moving band passing over the
30 said guide rollers to form the supporting surface, and means for advancing the paper web between the said supporting surface and the coloring roller so that one side of the web is in contact with the supporting surface at the same
35 time that the other side is in contact with said coloring roller.

5. An apparatus for manufacturing a carbon paper from a thin porous paper web comprising
40 a coloring roller, guide rollers positioned adjacent to said coloring roller and so arranged with respect thereto that any material advancing over the said guide roller will form a supporting surface for the paper web contacting the coloring roller, an endless moving band passing over the
45 said guide rollers to form the supporting surface, and means for advancing the paper web between the said supporting surface and the coloring roller so that one side of the web is in contact with the supporting surface at the same
50 time that the other side is in contact with the said coloring roller, and a scraper which removes coloring matter taken up by the endless band prior to its return to function as a supporting surface.

6. The apparatus as in claim 5 in combination with means for heating the supporting surface formed by the endless band.

7. The apparatus as in claim 5 in combination with a small heated container to receive
60 and fluidize the scraped off coloring material, and a larger container with which the said smaller container is in communicative association.

8. The apparatus as in claim 2 in which the guide rollers for conducting the paper web are
65 arranged in an essentially circumferential association with respect to the roll of paper web starting material.

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