May 30, 1933. C. L. H. SUPLIGEAU ET AL 1,911,592

METHOD FOR FORMING COPYING SHEETS

Filed Jan. 31, 1931 2 Sheets-Sheet 1

Fig. 1.

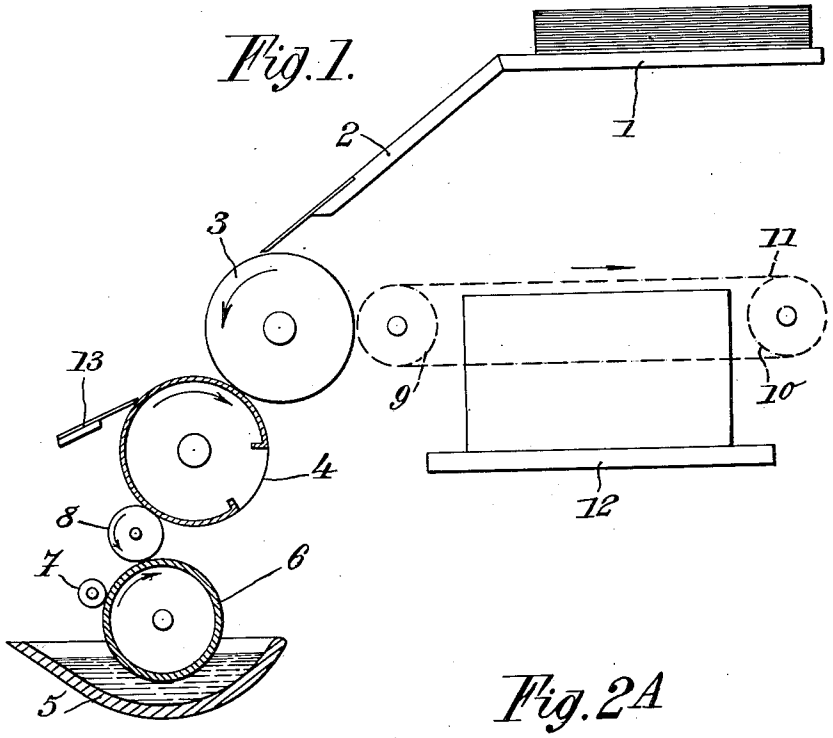


Fig. 2A

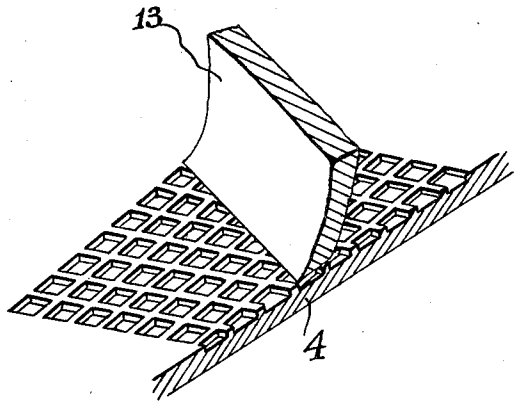
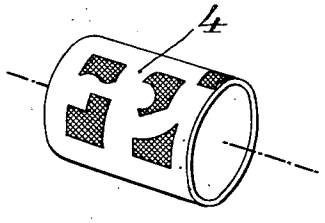


Fig. 2.



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Fig. 3.

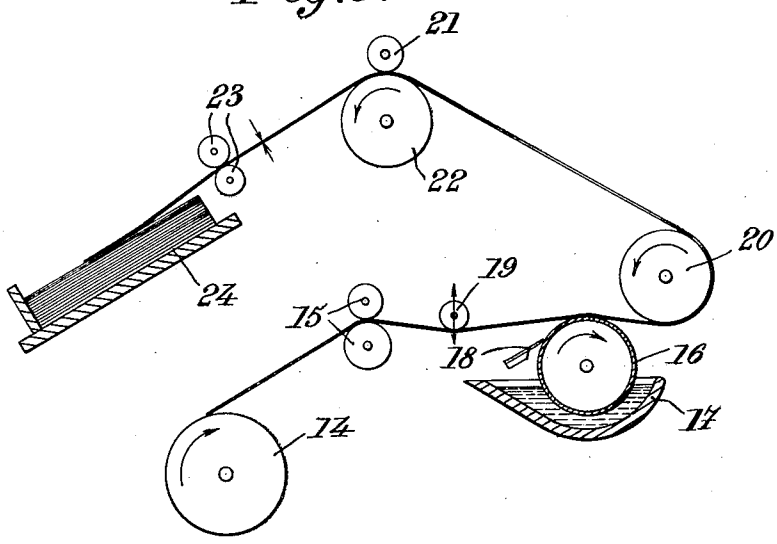
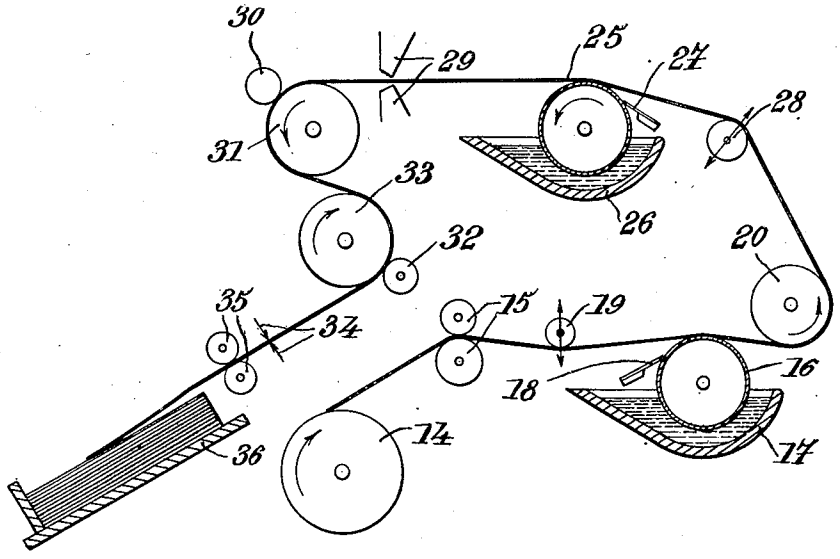


Fig. 4



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Patented May 30, 1933 1,911,592

UNITED STATES PATENT OFFICE

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METHOD FOR FORMING COPYING SHEETS

Application filed January 31, 1931, Serial No. 512,672, and in Belgium February 14, 1930.

The present invention relates to methods, apparatus and compositions of matter for forming copying sheets and, more particularly, those of the type provided with limited copying areas.

In forming copying sheets having limited copying areas, it has been the practice to cover portions of one side of a sheet of paper with a layer of copying composition similar to that employed on ordinary carbon papers. Inasmuch as these sheets frequently carried printed captions or other indications on one side, it was necessary to find means for spreading the copying composition so as to cover certain definite, limited regions of the reverse side. Ordinary printing rolls were, at first, tried, but, since the portions carrying the copying mixture (ink) extended beyond the surface of the printing roll, the paper was frequently torn. It was then attempted to carry out the same operation by using rolls provided with depressions or recesses corresponding in form to the area designed to receive the copying mixture; but in this case the copying composition or ink, when applied to the paper, spread at the edges.

One of the objects of the present invention is to provide a method, apparatus and composition capable of being applied to a paper so that the edges limiting the copying area are perfectly defined.

Another object is to provide a method for rapidly applying copying composition to either one or both sides of the sheet of paper.

Further objects will appear in the course of the detailed description now to be given with reference to the accompanying drawings, in which:

Fig. 1 is a diagrammatic section showing one constructive embodiment of the invention;

Fig. 2 represents, in perspective, a printing roll designed to be used for carrying out the invention;

Fig. 2A is a section through the surface of the printing roll showing, in magnified form, the form of the impressions;

Figs. 3 and 4 are two other illustrative embodiments of the invention showing how copying composition may be applied to one or both sides of a sheet.

Referring to Figs. 1, 2 and 2A of the drawings, there is shown an assembly composed of a support 1 for a stack of paper, a runway or guide 2 feeding a pressure cylinder 3 provided interiorly with means for being cooled by a refrigerating liquid, a printing cylinder 4 to be described in detail further on, a steam-jacketed tank 5 adapted to receive copying mixture or ink, a feed cylinder 6 provided with steam, electric or hot-air heating means and driven in any convenient way, a roll 7 regulating the amount of ink carried by cylinder 6, an inking roll 8 adapted to transfer the ink from feed-roll 6 printing cylinder 4, a squeegee or scraper 13 adapted to remove the ink from all portions of printing roll 4 except those engraved, a pair of pulleys 9 and 10 carrying a belt 11 adapted to receive the inked sheets from roll 3, and a support 12 adapted to receive and stack the finished sheets.

Printing rolls 4 are similar to those commonly used in heliograving, rotograving and the like and have a plurality of microscopic lines of capillary dimensions formed therein (see Fig. 2A) intersecting one another, preferably at right angles, and lying out of parallelism with the generatrices of the printing roll. Those portions of the roll not ruled are perfectly smooth and cylindrical.

The manner in which the apparatus operates is practically evident from an inspection of the drawings. Paper fed from stack 1 along guide 2 slides onto cylinder 3 and receives a coat of inking mixture from printing roll 4, the latter being supplied with ink from reservoir 5 by elements 6, 7 and 8 in a manner which is perfectly obvious. Scraper 13 removes ink from all areas other than those engraved and the finished article is carried off by belt 11 to be stacked on support 12. It is to be noted that while bath 5, feed and printing roll 4 are heated, roll 3 is cooled by a refrigerating mixture in any convenient manner desired. This is done so that the copying mixture, which is rich in waxes and similar excipients, may be solidi-

fied as soon as applied to the sheet supported on roll 3, thereby permitting its being stacked immediately.

The printing composition or ink may be of the type generally employed for making non-smearing carbon papers. It has been found, however, that the following composition, when used in the apparatus hereinabove described, provided with both heating and cooling means, has especially desirable properties as to capillarity when applied to the printing roll and solidifies rapidly when cooled in contact with roll 3.

The composition contains

Carnauba wax	7 parts
Montan wax (refined)	3 parts
Vaseline (white)	14 parts
Pigment (lake or the like formed from an aniline base and an aluminium salt)	Quantities sufficient

The quantity of pigment as well as its character may be changed at will in accordance with the color desired and its intensity. Where deep colors are to be employed, stearates or oleates may be used.

The above-described composition is solid at room temperatures and becomes liquid when heated in a steam-jacketed vessel of the type of tank 5. Its liquid condition is maintained during passage over elements 6 and 8 to printing roll 4 by any convenient form of steam, electric or other heating system fitted to the latter.

Referring now to Fig. 3 of the drawings, an assembly similar to the one represented in Fig. 1 is shown including a paper roll 14 feeding a series of guides 15 and 19, the latter guide being displaceable in vertical directions so as to vary the paper's tension,—a printing roll 16 immersed in a heated bath 17 containing inking mixture and fitted with a scraper 18, siminar to element 13 in Fig. 1, roll 16, being heated,—a cooled roller 20 out of line with printing roll 16 and adapted to effect solidification of the copying mixture applied by the latter, roll 20 being displaceable if desired,—driving rolls 21 and 22 adapted to draw the paper over cooling roll 20 from feed roll 14,—a pair of guides 23 for the finished article onto a stack support 24,—and means of any convenient design interposed between elements 21, 22 and guides 23 for sectioning the inked paper into proper lengths.

The operation of this form of assembly, with the exception of being continuous, is substantially the same as that of the one shown in Fig. 1, such elements as 7 and 8, 9, 10 and 11 being omitted. If the paper coiled on roll 14 be already printed on one side, the other side will carry limited areas of copying composition properly positioned with respect to the printed areas.

The assembly represented in Fig. 4 differs from the one shown in Fig. 3 only in the adjunction of a second series of ink-applying elements adapted to spread inking composition on the opposite side of the paper receiving ink from roll 16. Inking composition is first applied to one side of the paper by the elements numbered 14 to 20, then passes over a displaceable idler 28, similar to element 19, and finally passes over a train 25, 26, 27, similar to elements 16, 17 and 18 positioned so as to apply ink to the face opposite that in contact with printing roll 16. Printing roll 25 and bath 26 are heated and the paper coming from the latter is cooled by a pair of cooled air blasts 29 directed against opposite faces of the sheet. Further cooling may be effected by rolls 30, 31 and 32, 33 and the sheet may be cut at 34 to be delivered by guides 35 to stack support 36.

What we claim is:—

1. The method of making carbon copying sheets having limited copying areas comprising applying a heated copying composition to paper by means of a heated printing roll having a photo-engraved microscopic intaglio surface and cooling the paper directly after printing.

2. The method of making carbon copying sheets having limited copying areas comprising applying a heated copying composition to paper by means of a heated printing roll having photo-engraved intersecting microscopic lines and cooling the paper directly after printing.

In testimony whereof we affix our signatures.

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ROBERT RICHARD JEAN GUYOT.