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C. G. ROSENHAUER

STENCILING MACHINE

Filed Oct. 15, 1924

Fig. 1.

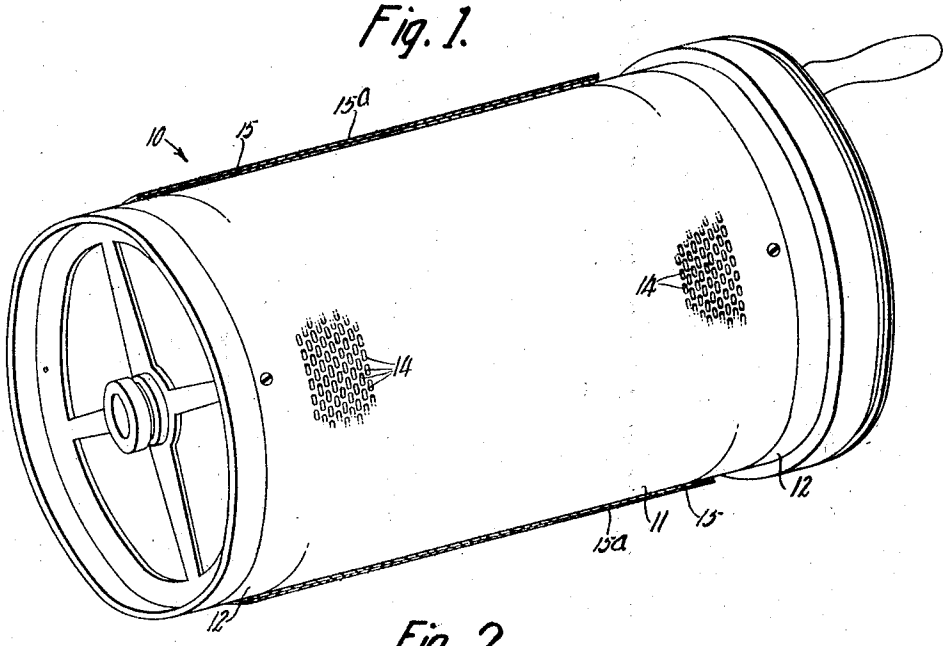
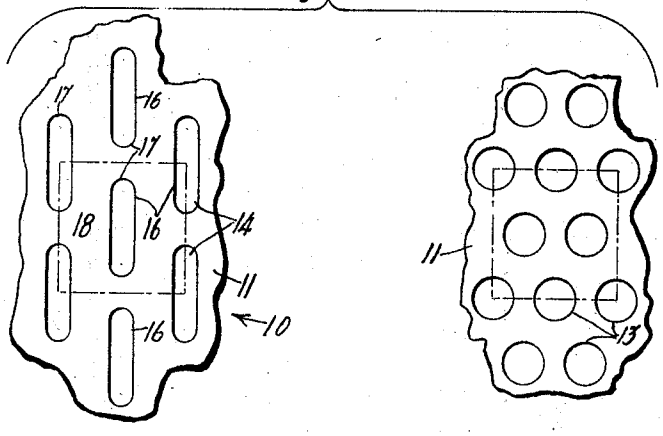


Fig. 2.



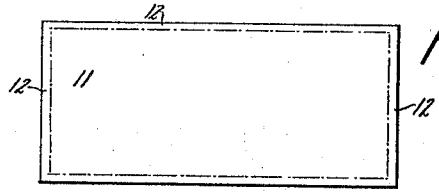


Fig. 3.

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UNITED STATES PATENT OFFICE.

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STENCILING MACHINE.

Application filed October 15, 1924. Serial No. 743,646.

To all whom it may concern:

Be it known that I, CHARLES G. ROSENHAUER, a citizen of the United States, residing in Brooklyn Borough, in the county of Kings, city and State of New York, have invented certain new and useful Improvements in Stenciling Machines, of which the following is a specification.

This invention relates to the foraminous hollow impression drums or cylinders of duplicating or stenciling machines, in which it is the practice to wrap an ink pad around such cylinder, and to feed ink to the pad through the perforations in said cylinder.

It is a desideratum that the foraminous cylinder shall afford a maximum support for the pad, the stencil and the work-sheet at the stenciling operation. The wax stencil-sheet lies upon the ink pad. The work-sheet or copy-sheet is pressed against the stencil-sheet by a roller. The maximum support is desired in order to produce clear inked characters upon the work-sheet. In attempting to secure this result, said cylinders were formerly made with minute holes, considerably spaced apart from one another. Said holes were round, and a maximum of unperforated surface of the cylinder was thus provided for supporting the sheets during the stenciling pressure; but such holes proved inadequate for supplying ink to the pad. Moreover, they were apt to clog quickly, and to be difficult to clean, and oftentimes the ink became solidified, so that it could not be removed by the usual cleaning fluid. Moreover, the use of such cylinders or drums so perforated made it necessary to change the ink pad frequently, which was a disadvantage.

In current practice it is sought to overcome these troubles by increasing the diameter of the perforations and placing them more closely together. It is found, however, that the work-sheet is by this expedient deprived of proper support, so that the copy made does not possess uniformity and clearness.

Another difficulty in the current practice is due to the great number of perforations necessary in the cylinder. Warping is caused by the operation of punching the ink-holes in the metal. The metal is found to bulge considerably at its middle portion, and prominences and hollows are apt to be made throughout, making it necessary to submit the same to careful inspection, and to secure evenness by hammering out the uneven places. The difficulty arises from the compression of the metal around the edges of the numerous holes, the aggregate of said compression or peening being considerable, owing to the great number of perforations.

Another difficulty in current and former practice is in the application of the ink to the inside of the cylinder, which is generally effected by means of bristles, which tend to force the ink through the perforations to the ink pad. The brush is found unsatisfactory, it being impossible for the bristles to project freely into the perforations and into contact with the ink pad to carry the ink thereto.

It is an object of the invention to overcome these difficulties, and to avoid trouble from clogging of the perforations, and to render it easier to secure proper feed or flow of ink, and to improve the application or distribution of ink, and to secure an excellent quality of copying on the work-sheet.

In securing these and other ends, the original cylinder or drum is made foraminous by means of perforations which are of elongated form, the elongation being preferably in a direction circumferentially of the cylinder. These perforations are of such size and number and so spaced that the aggregate opening over a given area of the cylinder may be about the same as in the case of a cylinder built according to current practice and provided with large round holes; but, owing to the elongated form of the hole in the present invention, the area of the unperforated surface of the cylinder is substantially increased. In other words, a substantially better support is given to the work-sheet, ink mat and stencil-sheet at the copying operation, without diminishing the capacity of the cylinder for supplying ink to the pad. In fact, substantially the same great area of the cylinder is left unperforated as was the case with the minute perforations of the former practice first above mentioned. The invention therefore gives the advantage of the abandoned mi-

nute perforations, in that it affords a large area of supporting surface to the work-sheet. The ink is much better confined to the mat, than in the case of large round perforations, owing to such prevalence of unperforated area. In other words, the ink is better imprisoned between the mat and the cylinder, and the tendency for the ink to be forced back into the perforations is overcome. Each of the elongated perforations has a greater area than any round perforation that has heretofore been found practicable, and therefore affords a better supply of ink, while the perforation is still short enough so that the cylinder is strong and substantial, and capable of withstanding the necessary pressure at the stenciling or copying operation. Moreover, the bristles of the inking brush enter the elongated perforations readily, and, since said perforations extend all in the same direction, the inking brush will enter readily into all the perforations within its scope. The direction of the perforations being around the cylinder, the inking may be done by a motion of the brush from side to side, the bristles readily going entirely through the perforations and into contact with the pad and depositing ink directly thereupon, and also forcing into the pad any ink that may have remained in the perforations from former inking.

Owing to the elongated shape of the perforations, there is substantially less compression of the metal at the perforation-punching operation than heretofore, with the result that the bulging and depressed areas of the cylinders, having round perforations, are entirely eliminated, and cylinders made with the longer perforations do not deviate from their perfect cylindrical shape, and inspection and hammering are rendered unnecessary.

Other features and advantages will hereinafter appear.

In the accompanying drawings,

Figure 1 represents in perspective a cylinder of an Underwood duplicating or stenciling machine, embodying the present improvements in the preferred form.

Figure 2 is a diagrammatic enlargement, showing at the left a fragment of the perforated cylinder seen at Figure 1; and showing at the right, for comparison and to give an understanding of the nature of the invention, a corresponding fragmentary area of a cylinder made according to current practice. In this view the cylinder is magnified eight times.

Figure 3 shows the perforated plate before it is rolled up to make the cylinder seen at Figure 1.

The stencil-drum 10 usually is in the form of a plate 11 provided with perforations and rolled up to make the cylinder. The field of perforations is enclosed by a frame consisting of wide unperforated borders 12 forming part of the original plate. According to the current practice, each perforation is circular (see 13, Figure 2), and its diameter is .081 of an inch, the holes being made in rows, the rows spaced apart (from center to center) 1/8 of an inch, and the holes in each row being spaced apart (from center to center) 1/4 of an inch. The holes in each row are staggered with reference to those in the next row, or have an echelon arrangement. The area of each circular hole, according to current practice, is .00515 of a square inch; and for each hole there remains an area of .010475 of a square inch of solid or unperforated metal. That is, in a given field of the cylinder, the surface area of the solid remaining metal is about twice as great as the aggregate area of the perforations in current practice.

In carrying out the present invention, the perforations are made underwidth and overlength; in other words, the perforations are elongated and the width is lessened in comparison with the diameter of a circular hole of the same capacity. The underwidth hole conduces to proper support of the ink mat during the stenciling of a work-sheet against the pressure of the usual roll in a rotary duplicator, so that excellent copies are made. This underwidth is secured without danger of the hole becoming clogged with ink, by reason of the expedient of making the hole overlength, that is, the length of the hole is greater than would be the diameter of a circular hole of the same capacity.

In the preferred form of the present invention, the width of each oblong perforation 14 is about 3/64 of an inch, this narrowness being conducive to good support for the ink pad 15 and copy-sheet 15ª at the stenciling operation. The over-all length of the perforation 16 is about 3/16 of an inch, this length being conducive to free flow of ink through the perforation, and facilitating access of the bristles of the usual inking brush through the perforation to the ink-mat; while this length of hole permits the use of a hole-punching die of substantial character. The perforation is preferably straight-sided, with semi-circular end portions 17. The perforation extends in a direction around the cylinder 10, Figure 1, facilitating the working of the ink-brush bristles into the perforations. Each circumferential row of elongated perforations is spaced .125 of an inch (measuring from center to center) from the next row, or 8 rows to the inch. The rows are evenly spaced, and (considered circumferentially of the cylinder) the distance from the central point of each elongated perforation to the center of the next is one-fourth of an inch. In each circumferential row the elongated perforations

are staggered with reference to those in the next row, each perforation being preferably opposite the space 18 between adjacent perforations in the next row; the perforations in alternate rows being preferably in line with one another.

The area of each elongated hole is about .00831 of a square inch; and for each hole there remains about .02295 of a square inch of solid metal. Thus, in a given field of the cylinder, the surface area of the solid remaining metal is nearly three times as great as the aggregate area of the perforations, thus producing a much better support for the ink-pad and copy-sheets at the stenciling operation than is the current practice, besides securing better flow of ink through the perforations, better access of the brush to the ink-mat, and better imprisonment or retention of the ink between the ink-pad and the cylinder, or minimizing the back-flow of the ink from the pad into the perforations. These advantages, moreover, are gained by the use of a perforation whose area is about 60% greater than the area of the circular perforation of ordinary stencil-cylinders.

It is one of the advantages flowing from the invention that in punching the perforations, there is absence of resultant springing, bending, warping or bulging of the cylinder-wall, such as commonly experienced in punching the round holes in current practice. In practice, two adjacent longitudinal rows of perforations are punched at one operation; then the cylinder is rotated to the next punching position and the punching operation is repeated, and so on until the perforating of the cylinder is complete. Owing to the multiplicity of the circular perforations of the current practice, the trouble exists that the perforated field is increased slightly in area at the perforating operation, owing to the peening effect of the dies upon the metal; the dies tending to pack or peen the metal at the edges of the perforations, and the aggregate peening causing the plate to bulge. The plate is oblong, Figure 3, and the bulging is much greater longitudinally than transversely of the perforated plate.

By the present invention this trouble is overcome, and at the conclusion of the punching operation the plate is found to be substantially flat or without objectionable bulging. This result is gained largely through the great reduction in the number of holes made in the plate; there being only about half as many holes lengthwise of the plate as in the current practice, which involves closely packed circular holes. The result may be considered as partly due to the capacity of the side walls of the elongated holes to yield laterally, or to be squeezed or sprung slightly or imperceptibly towards each other, thereby negativing the tendency of the peening to affect the plate as a whole, considered widthwise. A comparison of the present invention with the current practice is seen at Figure 3.

Variations may be resorted to within the scope of the invention, and portions of the improvements may be used without others.

Having thus described my invention, I claim:

1. A foraminous stenciling cylinder upon which is placed an ink-mat and a stencil-sheet, provided throughout with underwidth and overlength perforations regularly spaced apart to such an extent that the aggregate unperforated or solid area of the foraminous field is more than twice as great as the aggregate area of the perforations.

2. A foraminous stenciling cylinder upon which is placed an ink-mat and a stencil-sheet, provided throughout with underwidth and overlength perforations regularly spaced apart to such an extent that the aggregate unperforated or solid area of the foraminous field is more than twice as great as the aggregate area of the perforations, said perforations in the direction of their length extending around the cylinder.

3. A stenciling cylinder provided throughout its printing field with elongated perforations, the direction of the elongations being around the cylinder.

4. A stenciling cylinder provided throughout its printing field with elongated perforations, the direction of the elongations being around the cylinder, the width of each perforation being about 3/64 of an inch, and its length being about 3/16 of an inch, and having parallel side edges and rounded end portions.

5. A stenciling cylinder provided throughout its printing field with elongated perforations, the direction of the elongations being around the cylinder, the width of each perforation being about 3/64 of an inch, and its length being about 3/16 of an inch, and having parallel side edges and rounded end portions; the perforations being in rows which extend around the cylinder, and the distance from one row to the next being about one-eighth of an inch, measuring from the centers of the perforations.

6. A stenciling cylinder provided throughout its printing field with elongated perforations, the direction of the elongations being around the cylinder, the width of each perforation being about 3/64 of an inch, and its length being about 3/16 of an inch, and having parallel side edges and rounded end portions; the perforations being in rows which extend around the cylinder, and the distance from one row to the next being about one-eighth of an inch, measuring from the centers of the perforations, and the distance from the center of one perforation to the next, in the direction of the length of

the perforations, being about one-fourth of an inch.

7. A foraminous stenciling cylinder provided throughout its printing field with evenly-spaced perforations elongated around the cylinder, there being about 32 perforations to the square inch, and each perforation having a width of about 3/64 of an inch and a length of about 3/16 of an inch.

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Witnesses:
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