H. H. HANSON AND P. E. HODGDON.

PROCESS OF FINISHING PAPER.

APPLICATION FILED JAN. 4, 1921.

1,401,980. Patented Jan. 3, 1922.

Fig. 1.

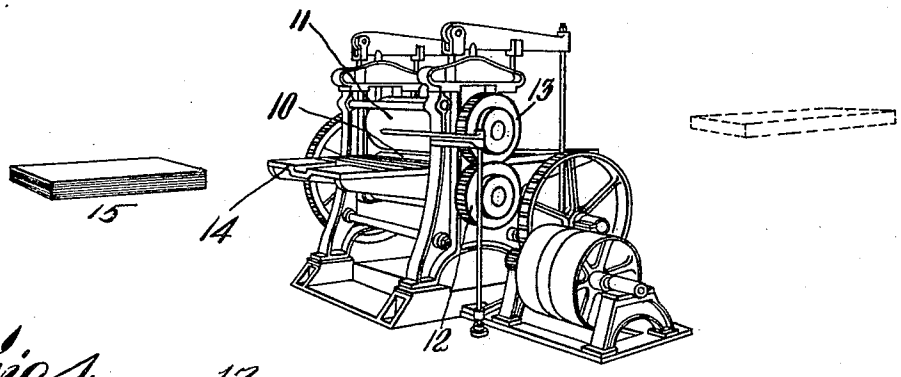


Fig. 4.



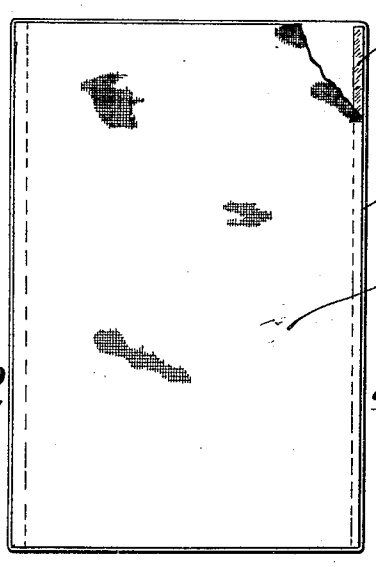


Fig. 2.

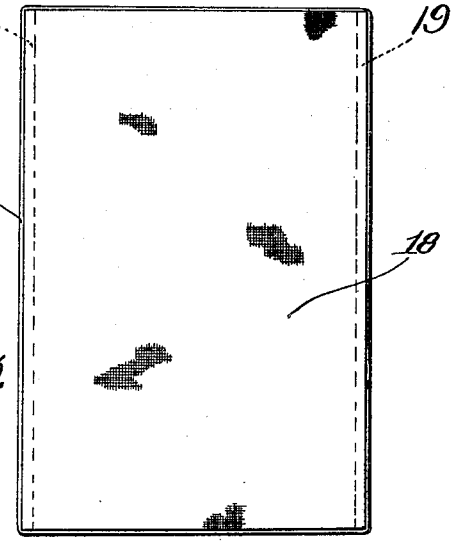


Fig. 3.

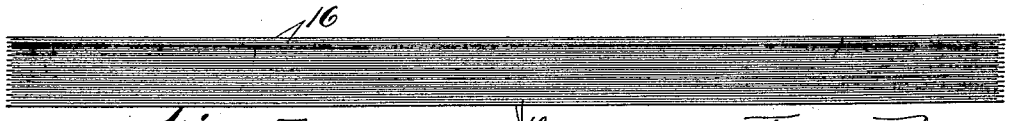


Fig. 5.

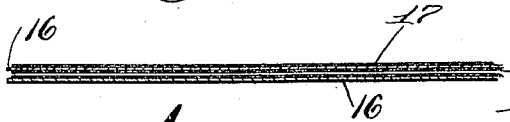


Fig. 6.

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UNITED STATES PATENT OFFICE.

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PROCESS OF FINISHING PAPER.

1,401,980. Specification of Letters Patent. Patented Jan. 3, 1922.

Application filed January 4, 1921. Serial No. 434,934.

To all whom it may concern:

Be it known that we, HUGO H. HANSON and PAUL E. HODGDON, both citizens of the United States, and residents of Boston, in the county of Suffolk, State of Massachusetts, and of Bangor, in the county of Penobscot and State of Maine, have invented new and useful Improvements in Processes of Finishing Paper, of which the following is a specification.

In the process of lawn-finishing or linen-finishing writing paper, it has heretofore been the custom to employ what is known as a "plater," which comprises a pair of co-acting press rolls capable of withstanding great pressure. Through these rolls is passed a stack which comprises sheets of properly tempered paper and sheets of linen or other textile fabric arranged in alternation. In addition to these sheets, the stack also comprises top and bottom sheets or plates of iron or zinc, and sheets of zinc which at intervals are located throughout the stack. Ordinarily, in building the stack or book, upon a relatively thin sheet of iron is placed first a sheet of zinc, then a sheet of textile fabric, then a sheet of paper, a sheet of textile fabric, and a sheet of zinc; and, by following this procedure, the stack or book is built until approximately thirty or more such units are placed together. On the top of the stack is then laid a sheet of iron, and the whole stack is passed between the press rolls one or more times to cause the irregular surfaces of the fabrics to become more or less embedded into the surfaces of the sheets of paper so as to impart thereto the desired finish. After the pressing operation has been completed, it is necessary to separate the various elements of the stack so that the sheets of zinc and fabric may be re-used in the formation of a second stack. The labor involved in building the stack and separating it into its component elements is very great, and the wastage of the fabric sheets forms an element of great expense in the paper-finishing process. Furthermore, in forming the stacks, it is essential, of course, that the fabrics should not be wrinkled but should be spread evenly and without folds or pleats on the zincs and the sheets of paper as the stack is being formed. Furthermore, the edges or corners of the fabric sheets are cut and frayed by the zinc plates as the stack is passed between the rolls of the plater. Moreover at times the corners and the edges of the fabric sheets are frequently curled over, and spoil the "cut" or "finish" of the paper. After prolonged experimentation, we have found that it is possible, first to reduce the labor involved in building and disassembling the stacks, to insure that the fabric sheets are always flat and unwrinkled when placed in the stack, and to effect a great saving in the wastage of the fabric sheets and to secure a marked economy in the production of the surface-finished paper.

We have discovered that it is possible to secure the sheets of fabric to the zincs or zinc plates, so that each zinc plate and its attached sheet of fabric may be handled as a unit in building the stack and disassembling the same. In other words, we have found that it is possible to glue or paste to one or both faces of a sheet of zinc a sheet or sheets of the fabric so that they will be permanently attached thereto.

Our experimentation has demonstrated the fact that it is impractical to glue or paste the sheets of fabric to the zinc by a layer of glue or paste which covers the entire face of the zinc and the contacting face of the fabric. Due to the great pressure of the press rolls against the stack, and to the relative ductility of the zinc, the zincs tend to become spread or elongated both longitudinally and laterally, and, when the entire surface of the fabric is cemented to the contacting surface of the zinc, the spreading of the zinc tears or cracks the fabric and renders it incapable of use without injury to the paper which is to be finished thereby. We have found that it is possible to prevent the cracking and tearing of the linen, and at the same time to accomplish the desired results, which we have hereinbefore mentioned, by pasting only the marginal edges of the fabric sheets to the zinc plates. Preferably only the side marginal edges of the fabric sheets should be pasted to the zincs, leaving the ends of the fabric sheets unpasted. By following this procedure, the spreading of the zinc under pressure does not cause the cracking or tearing of the sheets of fabric, as they are capable of expanding to some extent between their attached side edges.

On the accompanying drawing,—

Figure 1 illustrates, in perspective view, the ordinary plater, so-called, which is used in linen-finishing paper.

Figure 2 illustrates a sheet of zinc to which is attached a sheet of textile fabric.

Figure 3 represents the same element but shows the opposite face thereof.

Figure 4 represents a transverse section through the sheet of zinc to which the sheets of textile fabric are secured.

Figure 5 represents, in end elevation, a portion of a stack or book which is built up of paper and the intervening sheets of zinc and textile fabrics.

Figure 6 illustrates the first few units of the stack.

On the drawing,—the plater, which is illustrated in Figure 1, comprises a suitable frame in which is journaled the pressure rolls 10, 11, which are geared together by the gears 12, 13. These rolls are rotated by the usual mechanism employed for that purpose which needs no description herein. The machine is provided with a table 14 upon which the stack or book may be placed, and supported as it is being passed back and forth between the pressure rolls. This apparatus, as illustrated and described, is the usual apparatus employed for the purpose and does not differ therefrom. At 15 there is shown a stack or book ready to be placed upon the table and passed between the pressure rolls.

We have found that it is possible to carry out our invention by using the ordinary zinc plates which have heretofore been successfully employed, and to use any form of textile fabric or marker which has heretofore been utilized in finishing both faces of a sheet of paper. Thus we may employ a sheet 16 of zinc of the proper density or hardness, and sheets of linen or linen lawn or other equivalent material which has heretofore been successfully used. On both faces of each sheet 16 of zinc, we attach sheets 17, 18, of textile fabric, as shown in Figures 2, 3 and 4. Preferably each sheet of textile fabric is slightly less in width and in length than the zinc sheet to which it is attached, so that the linen sheets will not protrude at their edges beyond the edges of the sheets of zinc, thereby preventing to a large extent the fraying or pulling off of the fabric sheets. Ordinarily these sheets are all oblong in face view, as shown in Figures 2 and 3, and they are of the sizes which are ordinarily employed. Each sheet of textile fabric is secured by a narrow strip of glue, paste or cement 19 along its side marginal edge to the surface of a zinc plate, so that there is secured to each zinc plate, except those employed at the bottom and top of the stack, two sheets of textile fabric 17 and 18 which cover both faces thereof, so that the zinc plate and its attached sheets of fabric may be handled as a unit. Any suitable form of paste, glue or cement may be utilized for the purpose. We have found, for example, that ordinary animal glue may be successfully used, but that there is at times a tendency for the glue to spoil the finish of the paper where it overlaps that portion of the fabric sheet which is glued to the zinc, and we prefer to employ sodium silicate or a paste which we find on the open market under the proprietary name of "Stick fast gum", as we find that this does not injure in any way the finish of the paper. Of course other forms of paste, glue or cement may be utilized as found available. We find it desirable that the line of paste or glue, by which the sheets are cemented to the zincs, should be as narrow as possible without destroying the attachment of the fabric sheet to the zinc. In actual practice, we find that the line of paste should be approximately one-half of an inch in width, and that, even though the marginal side edges of the sheet should have the finish injured to some extent by reason of the presence of the glue, the subsequent trimming of the sheets of paper, which is customary, is sufficient to remove any portions of the sheet in which the finish is not perfect.

In building the stack, the same procedure, as has heretofore been followed, may be practiced, except that it is unnecessary to handle separately the sheets of fabric and the sheets of zinc. That is to say, the stack or book may be built by placing on a sheet of iron the bottom zinc which has a sheet of fabric attached to the upper face thereof by the lines or stripes of glue as herein described. A sheet of paper of the proper temper, containing, say, a moisture content of 7%, is spread upon the surface of the textile fabric, then upon this sheet of paper is placed a unit consisting of a sheet of zinc with both faces covered by sheets of fabric, then a sheet of paper, then another zinc sheet unit, and so on until the stack or book is of the desired thickness. Preferably the top zinc has only its under face covered with the fabric. Then upon the top of the pile is placed the usual iron plate and the book is now ready for passage between the rolls of the plate.

It will be understood, of course, that, when the book is passed between the rolls, the book or stack travels in a direction longitudinal of the lines or stripes of paste or glue.

It is not essential that the sheets of linen should be stretched taut between their side edges when securing them to the zinc plates, although, of course, it is desirable that they should be spread upon the surface of the zinc plates so as to form no wrinkles or pleats. Consequently, when the zincs spread

after continued use, the fabrics are capable of stretching to some extent and are thus prevented from tearing.

We have found in actual practice that, by following the procedure herein described, the length of life of the linen sheets may be greatly prolonged and that there is practically little wastage of the fabric sheets due to fraying, tearing or becoming wrinkled. Inasmuch as one of the heaviest expenses borne in the finishing of writing paper is the cost of the fabric sheets, we have, by the procedure herein described, effected great saving in the cost of finishing. We have found, with the same number of operatives, that it is possible to secure an increase in production of at least 25% and that the fabric sheets have a length of life approximately three times those which are employed without attachment to the zinc plates.

What we claim is:

1. A process of surface-finishing paper, which comprises pasting sheets of textile fabric only along their side edges to complemental metallic sheets, placing a sheet of paper between the metallic sheets in facial engagement with the textile sheets, and subjecting the book thus formed to progressive or rolling pressure longitudinal of the side edges of said sheets.

2. For use in surface-finishing paper, a flat metallic sheet, a sheet of textile fabric spread over the surface of the metallic sheet, and lines or stripes of adhesive material cementing said sheets together only along their side edges.

3. For use in surface-finishing paper, a flat metal sheet, sheets of textile fabric spread over both faces of said metallic sheet, and lines or stripes of adhesive material cementing such sheets together only along their side edges.

4. A book or stack ready for subjecting to the rolls of a plater, comprising a plurality of superposed sheets of paper and interposed units, each unit including a middle sheet of metal and outer textile fabric sheets cemented thereto only along their side edges.

In testimony whereof we have affixed our signatures.

HUGO H. HANSON.
PAUL E. HODGDON.