G. R. WYMAN.

METHOD OF SCORING PAPER BOARD.

APPLICATION FILED JAN. 31, 1911.

1,000,139. Patented Aug. 8, 1911.

Fig. 1.

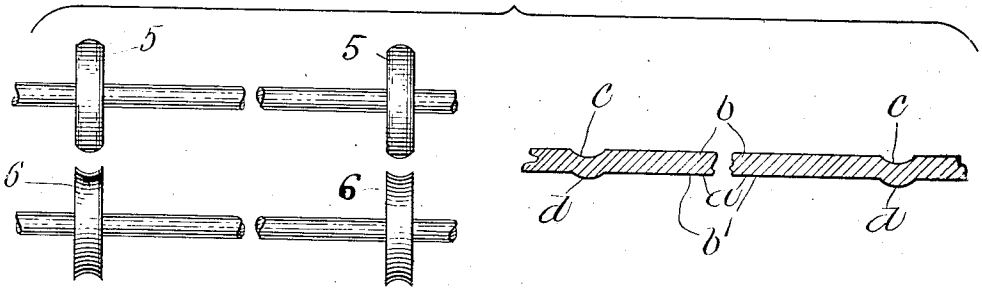


Fig. 2.

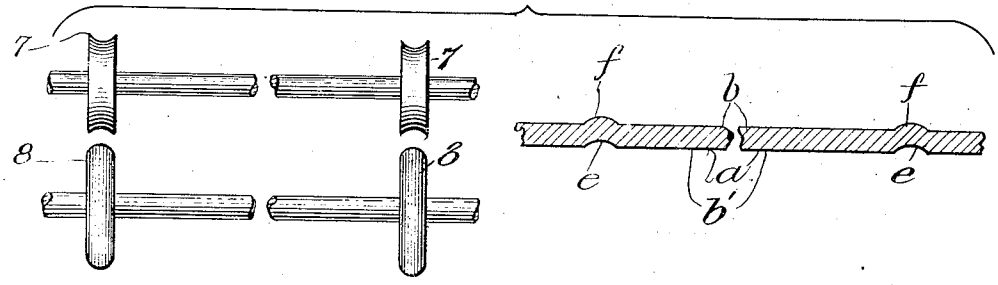
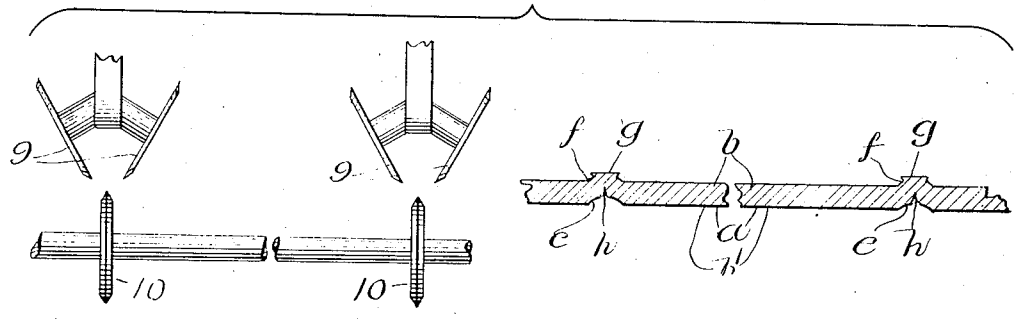


Fig. 3.



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METHOD OF SCORING PAPER-BOARD.

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To all whom it may concern:

Be it known that I, GEORGE R. WYMAN, of East Walpole, in the county of Norfolk and State of Massachusetts, have invented a new and Improved Method of Scoring Paper-Board, of which the following is a specification, reference being had to the accompanying drawings, forming part thereof.

This invention has reference to an improved method of scoring paper board, so called, so that said board may be bent at an angle without breaking.

The object of the invention is to so operate on paper board, formed of a series of layers secured together by adhesive, that without weakening or breaking said board its bending at an angle is facilitated.

This invention consists in the method of treating the paper board at or as a preliminary step to the scoring operation as shall hereinafter be more fully described and pointed out in the claims.

Figures 1, 2, and 3 of the drawing illustrate diagrammatically the several steps preferably used in the improved method of scoring paper board, with cross sectional views showing the product of each of said steps.

Similar characters of reference designate corresponding parts throughout.

Paper board of the nature herein referred to is formed of a series of superposed layers, strips or sheets of paper secured together by adhesive whereby a structure results which is found to be particularly adapted for use as a substitute for wood, in the manufacture of packing or protecting cases in which goods may be shipped. One of the advantages of the use of paper board is that, by suitable manipulation, it may be bent at an angle whereby it is possible to manufacture therefrom boxes or cases of rectangular form and having closures all formed from a single piece of the paper board. In order to so treat the stiff and rigid paper board that it can be bent at an angle it has been customary to score said board in the well known manner of scoring comparatively thin paper. Owing, however, to the thickness of the paper board and to the presence therein of a considerable amount of dried adhesive it is found that in such scoring the series of layers of paper do not readily accommodate themselves to the shape of the scoring tools and as a result, some of the paper layers are broken or the thick material is bent at such sharp angles that it is weakened along the lines of the scorings which, ultimately forming the corners of the boxes or cases, should be sufficiently strong to resist the torsional and tearing strains to which said boxes or cases are subjected in the exigencies of use. As a matter of fact it is found that the effect of scoring as heretofore accomplished has been to weaken the material at the scoring approximately ten per cent. or more.

In carrying my invention into practice I have for my object the retention of all the inherent strength of the paper board along the lines on which, ultimately, the board is to be bent or flexed and to this end I manipulate such portions prior to the scoring operation, to render the same more soft and flexible, in order that such portions shall readily accommodate themselves to the scoring implements and be shaped thereby without being torn or broken.

Preferably, apparatus is used in carrying out this method and I have shown diagrammatically in the drawings apparatus particularly adapted for this purpose. As shown therein the manipulation of the paper board is effected by two series of concave and convex rolls 5, 6, and 7, 8. In the first step, in the operation of this method, the paper board *a* is passed between rolls 5 and 6 with the surface *b*, which is ultimately to form the inside wall of the box, next the rolls 5, 5 so that shallow concavities or channels *c* are formed in said surface *b* and corresponding convexities *d*, *d* are pressed from the surface *b'* preferably without diminishing the thickness of the paper board. This paper board, shown in Fig. 1, is now preferably subjected to the second step of the process which consists in passing the material between the series of rolls 7 and 8 with the concavo-convexities *c*—*d*, *c*—*d* in registry with said rolls 7 and 8 whereby the material of said concavo-convexities is pressed in an opposite direction to form the concavo-convexities *e*—*f*, *e*—*f* the material of which, having been bent or pressed in two directions beyond the main body of material, is rendered more elastic and flexible than said comparatively rigid main body. The final step of this method is accomplished by passing the material, prepared as shown in Fig. 2, between a series of scoring devices 9, 9

and 10 whereby the flexible material of the concavo-convexities *e—f* is forced or pressed inward by the devices 10, 10 and is shaped between the devices 9, 9 to form the ribs *g*, *g* having the lines of flexure denoted by the grooves *h*, *h* and connected with the main comparatively rigid body of material by the unscored portions of the flexible concavo-convexities *e—f*.

Practice has demonstrated that, by this method of scoring, the paper board is not broken or weakened along the line of the scoring and, in fact, the subjection of the material thus scored to well known tests for strength used in paper manufacture indicates an increase of strength of approximately twenty per cent. above that of the unscored material.

It is of course obvious that in some cases I may dispense with one of the steps indicated in Figs. 1 and 2 of the drawing without departing from the spirit of this invention.

Having thus described my invention I claim as new and desire to secure by Letters Patent.

1. That method of scoring paper board which consists in flexing a strip of the body of the material back and forth to soften the same and subsequently scoring said softened portion to form a crease extending inward from that surface of the material toward which the material is eventually to be permanently flexed.

2. That method of scoring paper board which consists in forming a concavo-convex strip in said material and subsequently scoring the concave portion of said strip, substantially as described.

3. That method of scoring paper board which consists in flexing a strip of the body of material back and forth to soften the same and subsequently scoring said softened portion.

4. That method of scoring paper board which consists in forming a concavo-convex strip therein, then pressing said strip in the opposite direction, and subsequently scoring said strip at its concave side and forming a rib along its convex side, substantially as described.

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