

A TREATISE ON THE ART OF PIANOFORTE CONSTRUCTION Glue and It's Economical Useage

S Wolfenden - 1916

LONG and careful watching has convinced me that the usual treatment of glue is very wasteful, not only in respect of the quantity expended upon the work, but also of its holding power.

That treatment is to keep the solution as near as is possible to the boiling temperature, and constantly remove the scum, which always rises when 160° F. has been exceeded.

The current belief is that the scum is composed of impurities, which have to be got rid of by boiling, instead of being valuable adhesive material, which has been separated, possibly by coagulation, due to the heat to which the solution has been subjected.

The tenacity with which this belief is held is very strange, seeing that every glue user knows that scum continues to form as long as the glue is kept hot enough.

This practice not only wastes the material, but brings the remaining solution into a condition in which it will not run freely from the brush, but seems as though heavily charged with resin. This renders it difficult to spread thinly, and also demands that (for veneering) the cauls shall be heated to correspond, as otherwise the surplus glue could not be pressed out, having been brought into an intractable condition. The need thus produced for the extreme heat of cauls means a corresponding loss in fuel. Just how much damage is done to the holding-power of the glue cannot be easily expressed, but it is very considerable, and varies with the degree of the heat and the duration of the exposure. One authority on the subject of glue manufacture and usage says that it loses half a grade if kept at a temperature of 200°F. for one hour.

Recent researches show, that to secure the best results and greatest economy, the glue solution should not be heated, *in any stage*, above about 145° F., and that cauls should not be more than about 10° hotter.

Very careful experiment has proved that a solution containing about 60 per cent of solid glue will not jelly until it has been cooled to 75° F., which is really about the average temperature of a part-making shop, showing that there is no real danger of chilling.

The experiments which prove this were made with glue which had not been hotter than 155°F., and it is not asserted that the working temperatures herein given would be safe for a solution which had been previously overheated.

Better work can be made with thinner glue if these precautions are taken.

At least a 60 per cent solution is used by most workmen, but if made and used as above a 45 or 50 per cent mixture will not only save glue, but produce much better work, there being less glue in the joints: veneered surfaces are flatter, and the cauls

not having needed to be so hot, the saturation of the veneer is less, the cleaning up is therefore easier.

In some of the great case-making works in the United States, the glue used, in proportion to the surfaces covered, is only about 50 per cent of that which is common in this country. Admittedly a part of this saving is due to the use of machine spreaders, which only put upon the work the amount of glue which is known to be necessary ; these could not be economically installed in small factories but a careful attention to temperature of glue and cauls, and also to the thickness of the solution, will earn a corresponding reward.

Naturally the percentage of the solid glue must vary with its quality-if of low gelatinizing power the solution must contain more, but pianoforte makers mostly use good and expensive glues.

In the great works above mentioned, they have a standard percentage, according to the ascertained quality of the glue, and the temperature (both in the boilers and in the spreading machines) is carefully watched, both heaters and retainers being fitted with thermometers.

It would be of advantage to glue users if manufacturers could supply the same in, say, in. cubes. The solution would then be so easy to make that the present temptation to overheat in cooking would be much reduced, and also only the quantity actually needed could be melted from time to time ; it is clear that even repeated melting is very detrimental.

The affinity of gelatin (which is the principal constituent in glue) for water is its greatest defect, as judged from the point of view of the pianoforte maker, who has to send his work into all sorts of climates.

It is said that in some tropical regions, during the wet season a cake of glue left exposed on bench or desk will actually become a jelly, by mere absorption of water from the air assisted by the high temperature which prevails.

The addition of a very small quantity of bichromate of potash has the effect of rendering glue insoluble after it has been exposed to light, which however turns it black in time, and of course the light cannot penetrate deep joints.

It is said that by the addition of formalin the same result can be attained.

There is a real need for a new cement which shall have a tenacity equal to that of glue, which shall be used in a similar manner but which shall be free from that affinity for water which as aforesaid is the chief defect of glue.