(No Model.)

F. SELTSAM & R. HAGEN.

Manufacture of Glue.

No. 240,855. **Patented May 3, 1881.**

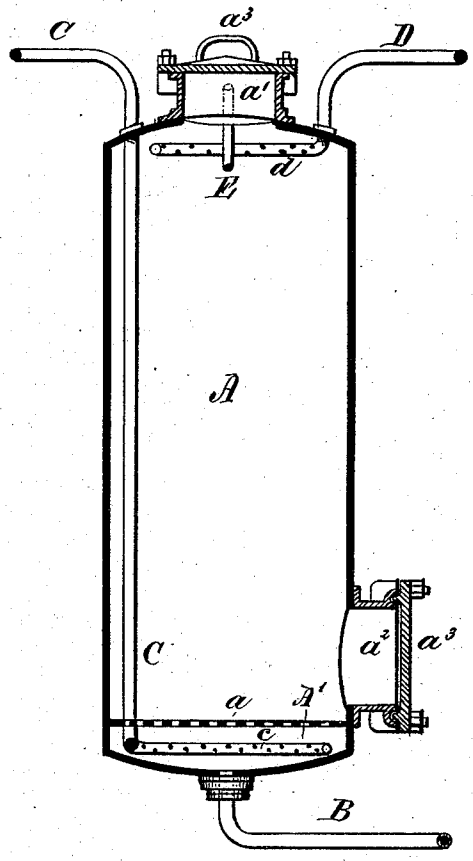
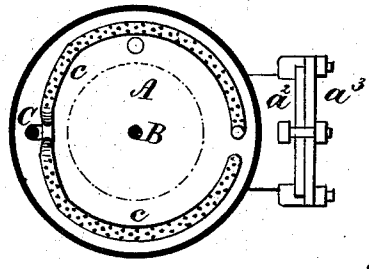


Fig. 1

Fig. 2.



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MANUFACTURE OF GLUE.

SPECIFICATION forming part of Letters Patent No. 240,855, dated May 3, 1881.

Application filed March 25, 1881. (No model.)

To all whom it may concern:

Be it known that we, FRIEDRICH SELTSAM and Dr. RICHARD HAGEN, subjects of the King of Bavaria, residing at Forchheim, German Empire, have invented certain new and useful Improvements in the Manufacture of Glue; and we do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters or figures of reference marked thereon, which form a part of this specification.

It is well known to all those conversant with the art that the manufacture of glue, more especially the manufacture of glue from bones by means of steam, leaves room for great improvement, and presents difficulties which are chiefly attributable to the following causes: first, in the mass of water required by all methods heretofore employed to profitably obtain the glue from the glue-producing tissue of the bone; second, in the time required for evaporating the thin glue-liquor in open vessels or in vacuum-pans, which, irrespective of the loss of time and fuel, never improves the product, but on the contrary lessens its value; third, in the difficulty of obtaining a thoroughly clear and transparent glue at all times without employing either deteriorating or otherwise hurtful chemical agents or employing costly apparatus, such as charcoal-filters or large decanting-vessels; fourth, in the use of whole or only slightly broken-up bones which are subjected for a long time to a process of washing and liming, or even treated with a sulphurous acid, &c., resulting in the loss of such substances that could otherwise be profitably employed for bone-meal or bone-black rich in carbon; and, lastly, in the relatively-long time required in carrying out the various steps of the methods now employed, which at certain periods of the year render the manufacture of glue an impossibilty.

The object of our invention is to remedy these difficulties; and it consists, first, in the use of unwashed or otherwise previously prepared or treated bones, except in comminuting them to the size of an ordinary pin, or in the use of the offal or refuse from the bone-mill having like physical properties; second, in moistening the comminuted bones or refuse of such from bone-mills in a watery solution of certain organic acids and in the consequent maceration to a slight degree of spontaneous heat; third, in treating the comminuted and macerated bones with steam in a vessel open at top, and, lastly, in the use of steam, and a comparatively small quantity of water and of air under pressure, successively.

In carrying out our invention the bones are first comminuted to the size of an ordinary pin, or we may employ the comminuted refuse of bone-mills which are then moistened with a watery solution of an organic acid of limited strength, such as oxalic acid. The moistened bones are then collected in heaps and allowed to rest and become heated when they are placed into a suitable steamer preferably of cylindrical shape in cross-section, having a perforated bottom and provided with perforated water and steam pipes. The bones are then subjected to the action of steam for a period of time varying with the nature or age of the bones, which has the effect to drive off the ammoniacal constituents thereof that are generally present in greater or lesser quantities in bones that have been stored for any length of time, and which have not been neutralized during the process of maceration. The described comminution of the glue-producing tissues of the bones produces immense surfaces easily penetrated, while the overlying fine bone particles when charged in the steamer leave numberless interstices, whereby the mass practically forms a filter from which the concentrated glue solution passes off perfectly clear, while the action of the acid upon said comminuted bones prepares the glue-producing tissues thereof for rapid conversion by the steam.

After the ammoniacal constituents have been destroyed and eliminated from the bones, the steamer is closed and the bones are subjected to the action of steam, under a pressure of from two to three atmospheres, for a certain length of time, after which the steam is let out by means of a suitable cock and so much boiling water admitted at intervals as will thoroughly dissolve the bone-tissues previously jellied by the action of maceration with an acid and by that of the steam. The contents of the steamer

are now allowed to stand one hour, more or less, under the action of air at a pressure of about one atmosphere, after which the concentrated solution containing about twenty-five or thirty per cent. of the dry bones in glue is forced, under constantly-increasing atmospheric pressure, into the copper coil of a wooden vat, where it may, if desired, be further concentrated in a very short time, which, however, is an impossibility with the concentrated solution obtained previous to the admission of boiling water. Finally, any glue remaining in or adhering to the walls of the steamer may be obtained by rinsing with hot or boiling water.

The dark yellow but brilliantly clear glue-solution jellies very rapidly and produces a wholesome and excellent glue, which is decolorated to a straw yellow by any of the well-known methods.

The whole operation, which is characterized by its cleanliness, simplicity, economy, and rapidity, is effected in from five to six hours. In this very short period of time, regardless of the season, we obtain, according to the richness of the material, from twelve to twenty per cent. of glue.

Having now described our process, we will proceed to describe our form of apparatus by means of which said process may be carried out, although any other suitable apparatus may be employed, and in the accompanying drawings we have shown in Figures 1 and 2, a vertical and transverse section, respectively, of an apparatus well suited to the purposes.

A is a cylinder, of any desired capacity, made of sheet metal and of a strength capable of resisting the pressure hereinbefore referred to. It is provided with a charging-aperture, a', which is left open during the elimination of the ammoniacal constituents of the borax, and a discharging-aperture, a^2, through which the material is removed after the glue is extracted therefrom, both of said apertures being adapted to be hermetically closed by means of suitable covers a^3. The cylinder is provided with a perforated false bottom, a, or grate, upon which the material is charged, which bottom, in Fig. 2, is removed to show the arrangement of steam-pipe.

B is the discharge-pipe through which the glue is discharged, connecting with the space A′, formed by the bottom of the cylinder A and the grate a, as shown.

C is the steam-pipe, terminating in a perforated coil, c, in chamber A′, to force steam through the grating and the material upon the same, for purposes already described.

D is the hot-water pipe, terminating, like pipe C, in a perforated coil, d, at the upper end of the cylinder, at which end also enters the air-pipe E, through which pipes hot water and air are forced into the apparatus, for purposes hereinbefore set forth.

Having now described our invention, what we claim is—

1. The process of converting the glue containing tissues of bones into glue, by macerating the refuse of bone-mills or finely-comminuted bones with an organic acid in solution, preferably oxalic acid, as described.

2. The process of converting the glue containing tissues of bones into glue, by treating the refuse of bone-mills or finely-comminuted bones with an organic acid in solution, and heaping the material so treated until slightly heated, as set forth.

3. The process of converting the glue-containing tissues of bones into glue, by first macerating the refuse of bone-mills or finely-comminuted bones with an organic acid in solution, as set forth, then driving off the ammoniacal constituents by means of steam, as described.

4. The process of converting the glue-containing tissues of bone into glue, by macerating the refuse of bone-mills or finely-divided bones with an organic acid in solution, driving off the ammoniacal constituents of the macerated bones by means of steam, and dissolving out the glue-tissues by means of steam under pressure, all substantially as hereinbefore set forth.

5. The process of obtaining glue from bones by macerating the refuse of bone-mills or finely-comminuted bones with an organic acid in solution, driving off the ammoniacal constituents not neutralized by maceration, by means of steam, dissolving out the glue-tissues by means of steam under pressure, to obtain a concentrated solution, and finally removing or dissolving out the remaining glue-tissues by means of hot water under pressure, all substantially in the manner as set forth.

6. The process of obtaining glue from finely-comminuted bones or the refuse of bone-mills, by maceration with a solution of an organic acid, expelling the ammoniacal constituents, dissolving out the glue by means of steam under pressure, to obtain a concentrated glue solution, forcing hot water under pressure into the bones to wash out the remaining glue, and finally expelling the watery glue-solution by means of air under pressure, and evaporating to the proper consistency, all substantially as and for the purposes set forth.

7. In the process of manufacturing glue from bones, comminuting or shredding the bones before extracting the glue therefrom, substantially as and for the purpose specified.

In testimony whereof we affix our signatures in presence of two witnesses.

FRIEDRICH SELTSAM.
RICHARD HAGEN.

Witnesses:
J. NAINLACH,
ALFRED MUSSINAN.