

UNITED STATES PATENT OFFICE.

JOSEPH ROSS HUNTER, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR
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PRODUCT FROM BONE.

SPECIFICATION forming part of Letters Patent No. 781,880, dated February 7, 1905.

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To all whom it may concern:

Be it known that I, JOSEPH ROSS HUNTER, a citizen of the United States, residing in the city and county of Philadelphia, State of Pennsylvania, have invented a novel Construction of Products from Bone, of which the following is a specification.

My invention consists of a new product from bone.

In carrying out my invention I treat bone of any kind in any suitable manner to remove from it fatty matter and then remove the mineral salts, particularly lime, therefrom, or I may omit the removal of the fatty matter *per se* and carry out the invention in the manner hereinafter described, removing the fatty matter as a part of the same operation that is required to remove the mineral salts. I preferably wash the bone thoroughly to remove the flesh or foreign matter therefrom, cut it up to make it more convenient for the handling, and to render all parts of the bone more easily accessible to the treating fluid, and thus place it in vessels containing a solution of hydrochloric acid (HCl) and water. The percentage of hydrochloric acid used is preferably relatively small, being about twenty per cent., but varies slightly, according to the character of the bone, whether fresh or dead, and the temperature at which the process is to be carried out. The extent of action of hydrochloric acid upon the mineral salts relatively to the action upon the fiber of the bone which I wish to retain depends upon the temperature, and I have found that the most suitable temperature is in the vicinity of blood-heat. The fiber remaining from the hydrochloric acid treatment, ordinarily termed "ossein," is then washed thoroughly and the hydrochloric acid removed by churning or otherwise working in a solution of sal-soda. If the bone fiber has at this time an objectionable color, it may be bleached by chlorid of lime without interfering with the result which I wish to obtain. The bone fiber is preferably kept wet until the process is complete, but may be moistened if it dries too much. From the

soda-washing or from the bleaching process the bone is put into a beating-engine and thoroughly beaten. This breaks the fiber up somewhat; but I preferably divide it, and I complete the division in a refining or Jordan engine to the fineness required for the purpose to which it is to be applied. The resultant fibers are pliable and soft and have a ragged body caused by the projection of small spurs, filaments, splints, or particles therefrom much as is the case with wool, and the same result is obtained from this fiber in my product as in wool—namely, that it may be felted or woven to advantage, and under strong pressure it may be formed into masses or sheets without the use of adhesive. The coarse products are used for the bulky articles and for those requiring comparatively little capability or necessity of flexure and are preferably united without an adhesive; but for the finer and more delicate fabrics and products a sizing is preferably used.

My material is a non-conductor of heat and of electricity, and even in the divided form will not take fire nor readily support combustion. In the compressed form it is substantially fireproof, and it is at all times impervious to moisture.

Where reference is made herein to the removal of fluid fatty matter and lime or mineral matter, and particularly the last two named, or to material as free from these substances, the substantial removal of and substantial freedom from these substances will be understood to be intended, as an absolute removal of them, and particularly of the mineral matter is most difficult without the destruction of the fibrous residuum, and for most, if not all, purposes the entire removal of these substances is unnecessary. Where reference is made herein to lime or "delimed" bone, it will be understood that the lime or deliming refers to such mineral matter as contains calcium, which, as is well known, exists in bone largely in the form of a phosphate.

It will be evident that various changes may be made by those skilled in the art which may

come within the scope of my invention, and I do not, therefore, desire to be limited in every instance to the exact disclosure herein made.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. As a new product of manufacture, jagged fibers of bone from which mineral matter has been removed.
2. As a new product of manufacture, separated fibers of ossein.
3. As a new product of manufacture, shreds of delimed bone.

4. As a new product of manufacture, ossein fibers having spurs or filaments projecting therefrom.

5. As a new product of manufacture fibers from bone separated along general lines of natural cleavage.

6. As a new product of manufacture, shredded cartilaginous residuum from bone.

JOSEPH ROSS HUNTER.

Witnesses:

JOHN A. WIEDERSHEIM,
WM. S. JACKSON.