UNITED STATES PATENT OFFICE.

EDWIN B. EISING, OF NEW YORK, N. Y., ASSIGNOR, BY MESNE ASSIGNMENTS, TO HIDE-ITE LEATHER COMPANY, A CORPORATION OF MASSACHUSETTS.

LEATHER-BOARD AND PROCESS OF MAKING THE SAME.

1,234,315. Specification of Letters Patent. Patented July 24, 1917.

No Drawing. Application filed May 20, 1912. Serial No. 698,616.

To all whom it may concern:

Be it known that I, EDWIN B. EISING, a citizen of the United States, and a resident of the city, county, and State of New York, have invented a new and useful Improvement in Leather-Board and Processes of Making the Same, of which the following is a specification.

My invention relates to a process of making artificial leather or what is commercially known as leather-board, the same being manufactured mainly from scraps of leather, and used for various purposes to which natural leather is usually put. A very prominent use for this artificial leather in the industrial arts is in the manufacture of the heels of shoes.

The present invention resides in the process hereinafter set forth by which waterproof leatherboard is produced and also in the new product herein described. In addition to the waterproof qualities of the product of my invention, I am enabled, by reason of the novel process, to produce a board of extreme toughness and elasticity, thus making it durable and a very close approximation of natural sole leather.

According to my invention, I take the leather scraps or bits of natural leather, which are usually cast off or waste from factories manufacturing leather goods, and which constitutes the main body of my product, and I mix the same with a quantity of paper and long vegetable fibers such as are present in jute, bagging, strings and the like.

The precise proportions of these ingredients, which constitute the body of the stock, are largely elective, depending upon the special circumstances of each operation. For ordinary conditions and those conditions under which I prefer to operate, the proportions may be approximately 9.5 leather-scrap to 2 parts paper to 1 part strings or bagging.

These materials are placed in a beating engine or other suitable apparatus and are simultaneously washed of grit, dirt and the like impurities and ground up into a homogeneous mass of pulp. Preferably the water is drawn off from the stock continuously during the beating process and fresh water is continuously added to take the place of the water withdrawn. This insures a perfectly cleansed stock and a tough homogeneous product, free from grit, and readily susceptible to the waterproofing process. Further, the pre-washing treatment removes the salts of calcium and magnesia which are present in the stock and which would interfere with the subsequent waterproofing treatment by precipitating the waterproofing before the same is properly and thoroughly mixed with the leather fiber in the beater. The pre-washing is further important in that it removes the acids from the stock which acids would have the same bad effects as the salts before mentioned. When the stock is sufficiently reduced and cleansed it is ready to receive the subsequent treatment.

I next prepare two compounds or emulsions with which the stock is treated. The first of these compounds I prefer to form of the following ingredients, though I desire it understood that these may be varied within reasonable range of equivalents and effect on the stock; to wit:—Japan wax, stearic acid, paraffin, crude wax (which is a low-grade paraffin product), borax and water.

The precise proportion of these ingredients are not binding upon the success of the process excepting within certain limits or extremes. The proportions which I prefer under ordinary and the most satisfactory conditions, are approximately for about 1250 pounds of stock, Japan wax and stearic acid, 35 pounds each, paraffin and crude wax 20 pounds each, and borax 40 pounds, with a sufficient quantity of water to give the emulsion fluidity to a degree suitable for handling it as hereinafter described. Thus the amount of water for above given conditions may be 20 to 25 gallons. These ingredients, constituting the first emulsion, are mixed together and subjected to about 350 degrees Fahrenheit, bringing about a thorough admixture and emulsification of the ingredients.

The second compound or emulsion is com-

posed of soap (preferably rich in tallow, say 88%), stearin pitch (a residue of the manufacture of stearic acid), rosin and crude wax (a form of low grade paraffin).

The proportions here may also vary within certain extremes. Thus for the preferred conditions I would employ 60 pounds or more of soap to 40 pounds or more of stearin pitch to about 40 pounds or less of rosin and about 8 or 9 pounds of crude wax. The soap is dissolved separately in water and the pitch, rosin and crude wax are melted together and mixed in and stirred with the soap solution.

Having thoroughly beaten and washed the stock, I then pour into it while the beating engine is in operation, the above-described compounds or emulsions. I prefer to pour in the No. 1 emulsion first, followed closely by the No. 2 emulsion and after this has been done the operation of the beater is continued to effect a thorough admixture of all the elements. This beater operation results in active agitation which should be kept up for approximately fifteen minutes after the compounds or emulsions are admitted to the stock.

A suitable pigment is then introduced into the mixture in the beater to give the product the desired color. This coloring is preferably liquid and the agitation of the stock is continued during its admission.

At this stage in the process I have the stock or body of the artificial leather thoroughly reduced to a pulp-like form and in an active state of agitation with the ingredients of the two compounds or emulsions and the coloring matter. This mixture is mechanical, largely if not principally. The emulsions or compounds above described serve the purposes of waterproofing the artificial leather and also of giving it toughness, coherence and elasticity. It is necessary, however, to fix or render permanent the emulsions and pigments with the stock, and to do this I cause them to be precipitated upon the fibers of the stock by adding to the whole mixture a quantity of sulfate of alumina (a low grade alum). For the conditions above described, the amount of sulfate of alumina may vary from 75 to 85 pounds. This is mixed in with the mass in the beater and a steady agitation maintained until the necessary reaction is perfect, by which the compounds or emulsions and the coloring are precipitated onto the fibers of the stock. This process of precipitation may be observed by the clearing effect on the liquid or water in the beater contents. This liquid or water turns gradually from a muddy or cloudy condition to a clear state as the precipitation becomes complete. Thereby each individual fiber of the stock is united and coated with a certain quantity of the waterproofing and coloring agents.

After these steps have been accomplished the water is drained off from the stock and the latter is formed into sheets, pressed, dried and calendered very much in the usual manner. The finished product is an extremely tough, elastic sheet closely resembling natural leather and rendered completely proof against moisture in all forms. These qualities adapt it admirably to the various uses to which leather is put, particularly, as I have before mentioned, that of forming shoe heels.

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

1. The process of manufacturing artificial leather which consists in reducing the stock to fibrous condition, simultaneously washing the stock, adding to the washed stock compounds of (1) wax-like materials, stearic acid and borax and (2) soap, rosin and wax-like substances, and then precipitating such compounds upon the fibers of the stock for the purposes specified.

2. The process of manufacturing artificial leather which consists in adding to the stock or body of the product compounds or emulsions of (1) Japan wax, stearic acid, paraffin and borax, and (2) soap, stearin pitch, rosin and wax in substantially the proportions stated, and in precipitating such compounds or emulsions upon the fibers of the stock for the purpose specified.

3. The process of producing waterproof leatherboard from leather scraps and other fiber, which comprises the reduction of the leather and other fiber to a pulp condition, removing the leather acids and salts therefrom, adding a waterproofing solution thereto, precipitating the solution upon the fibers of the pulp, and forming the residue into sheets.

4. The process of producing waterproof leatherboard from leather scraps and other fiber, which comprises the reduction of the leather and other fiber to a pulp condition while washing the same to remove the contained leather acids and salts, adding thereto a waterproof emulsion containing wax, precipitating the emulsion upon the fibers, and forming the residue into sheets.

5. The process of producing waterproof leatherboard from leather scraps which comprises the reduction of the leather to a pulp condition, washing out the leather acids and salts therefrom, adding a waterproofing solution thereto, precipitating the solution upon the fibers of the pulp and forming the residue into sheets.

6. The process of producing waterproof leatherboard from leather scraps which com-

prises the reduction of the leather to a pulp condition while washing the same to remove the contained leather acids and salts, adding thereto a waterproofing agent, precipitating the waterproofing agent upon the fibers and forming the residue into sheets.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses this 3rd day of May, 1912.

EDWIN B. EISING.

Witnesses:

ISAAC B. OWENS,

KATE ROSENBERG.