R. S. AYRES.

METHOD OF MAKING PULP HEELS.

APPLICATION FILED MAR. 10, 1917.

1,322,081. Patented Nov. 18, 1919.

Fig. 1.

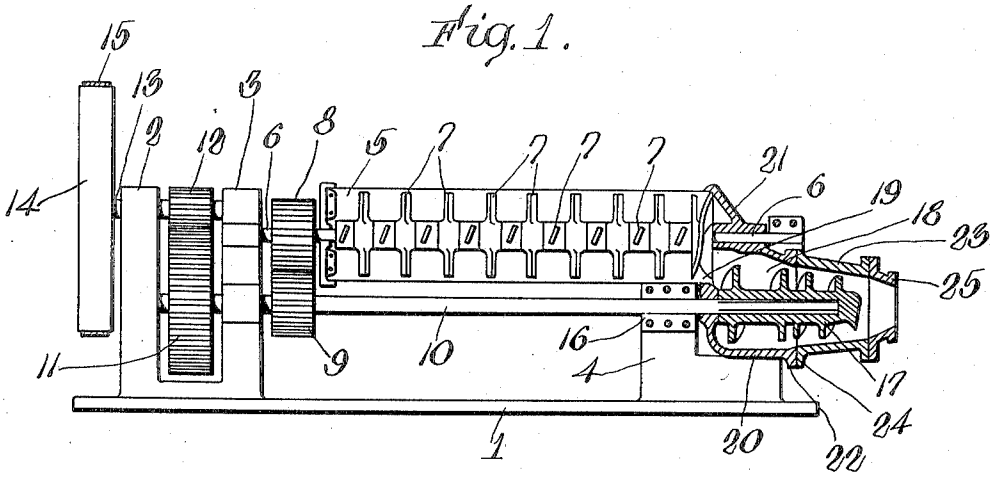


Fig. 2.

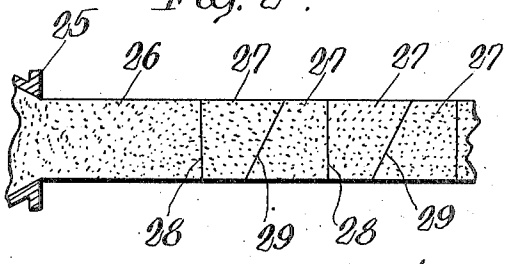


Fig. 3.

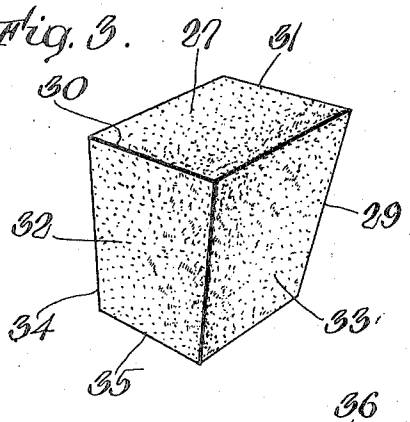


Fig. 4.

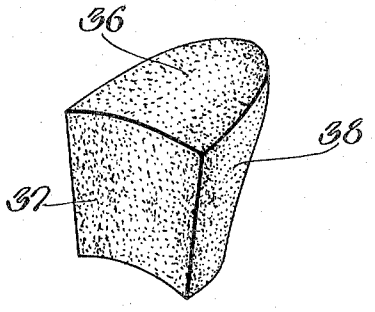
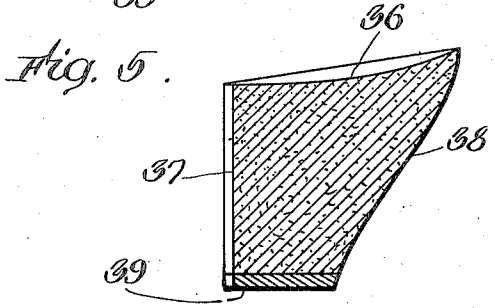


Fig. 5.



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UNITED STATES PATENT OFFICE.

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METHOD OF MAKING PULP HEELS.

1,322,081. Specification of Letters Patent. Patented Nov. 18, 1919.

Application filed March 10, 1917. Serial No. 153,881.

To all whom it may concern:

Be it known that I, RICHARD S. AYRES, a citizen of the United States, and resident of Brookline, county of Norfolk, and State of Massachusetts, have invented an Improvement in Methods of Making Pulp Heels, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

The present invention relates to the manufacture of pulp heels from wood, fiber, leatherboard, jute, cotton stocks, leather scraps, or the like, and the object is to improve and perfect such manufacture by using a simple machine and employing binders with the pulp.

In my prior application, Ser. No. 31,865, filed June 3, 1915, I have explained certain of the advantages of an integral, non-laminated, pulp boot or shoe heel and in my prior application Ser. No. 126,425, filed October 18, 1916, I have explained and described a method of manufacture, which may be advantageously employed in making such pulp heels. In the said prior method application, I have developed a process of handling large masses of pulp by separating a desired quantity of pulp capable for subsequent compression into a heel of desired size and style. This prior process relied upon compression and drying of the pulp material to give final form to the pulp heel, although such heel could be still further shaped by a usual heel trimming machine. In my present process I first shape the pulp material into a column or bar of pulp with a cross sectional approximating two dimensions of a heel, the top and bottom widths, or breast and rear contour. Such column or bar of pulp is then cut into approximately separate heel masses and subsequently either trimmed or compressed, or both, into final shape, a leather toplift being added during this stage of the process if desired, or subsequently fitted onto the heel.

In the present method of manufacture, also, I prefer to employ a suitable binder or binders which will harden the column or pulp or the blanks cut therefrom, setting the same without the necessity of a compression, although I would probably prefer to somewhat compress the individual blanks after they are cut from the bar and while still moist and mobile, and a further dry compression may be desirable.

By using a proper binder, which is non-oxidizing and self-hardening, the heel blank may be caused to contract during drying, so that it actually becomes hardened sufficiently for use, relying upon the action of the binder rather than on the compressive action of a machine. Such binders may be of the cellulose group and would be mixed into the pulp material while being beaten up or while in the machines before forced through a die. It will be understood that while I may employ such a binder without special drying and compressing, yet in some lines of work, the self-hardening action of the binder and the setting of the same will be materially hastened and improved by subjecting the heel blanks to a preliminary shaping, concaving the top of the heel to fit against the heel seat of the shoe, and then subjecting the blanks to a moderate heat of from 150° to 250° F., and then, when it is thus molded, the binding agent will complete the hardening. The particular kind of pulp employed, amount of binder, and other ingredients, such as waterproofing substance or the like, will necessarily have some effect upon varying the range of heat, amount of shaping, etc., but the essential point in this process consists in utilizing the binder as the principal hardening agent, rather than merely compressing by actual force, which is mainly relied upon in the process covered by my said prior application, Ser. No. 126,425.

In carrying out the present method of manufacture, I prefer to utilize a beating and die apparatus, which I will designate as a pug-mill, having a die of a proper form in cross section to give the preliminary shaping to the bar or column of pulp forced outwardly. As the pulp is thus formed, it can be cut in any suitable manner, preferably with alternating straight and slanting cuts to give the rough formation of rim and heel breast contours to each blank, the individual heel blanks being thus severed from a roughly formed bar.

Referring to the drawings illustrating a suitable machine, and different steps in the present process,

Figure 1 is a view partly in cross section of a combined beater or pug-mill, and die;

Fig. 2 is an enlarged vertical view showing the column of pulp as the same issues from the die;

Fig. 3 is a perspective of the blank cut from said column; and

Fig. 4 is a perspective view of the compressed and formed heel;

Fig. 5 being a cross sectional view on a slightly enlarged scale of the finally hardened and shaped heel with a toplift added and trimmed to complete style.

While any suitable die machine capable of handling and forcing pulp through a shaping die may be employed, I prefer to use a combined beating apparatus and die; as illustrated in Fig. 1. Such a machine comprises a base 1 having upright supports 2 and 3 for suitable journal bearings at one end and a support 4 at the other end, an open trough 5 in which the pulp may be mixed, which trough receives the shaft 6 and carries a plurality of two-bladed beaters 7, 7, arranged in staggered relation, substantially as shown. On the shaft 6 is a gear wheel 8 meshed with a corresponding gear 9 on the shaft 10, which latter shaft is journaled in the standards 2 and 3 and is operated by a gear wheel 11 meshing with the pinion 12 carried on the shaft 13 also carried in journal bearings in said supports 2 and 3, and having a pulley 14 at one end to which a belt 15 is connected with a suitable source of power. Preferably the shaft 10 is extended forwardly to a bearing 16 in the support 4, and has the thrust screw 17 keyed or otherwise secured on the end thereof, working in a chamber 18 to which an opening 19 admits the pulp from the trough 5. The chamber 18 is formed by the casting 20, with its upper end extending as shown at 21 to provide a fixed bearing for the trough 5 and a journaled bearing for one end of the shaft 6. The casting 20 has a flange 22 to which a second casting 23 is secured by belts or the like through a corresponding flange 24 and a removable die 25 is fitted in a similar manner to the member 23, as is usual. This die 25 has its opening formed to give a preliminary shape to the column or bar of pulp material forced therethrough, any suitable shape being capable of reproduction by said die, but preferably of truncated form in cross section, to approximate, roughly, the top and bottom dimensions of a shoe heel in cross section. In operation, the pulp material is supplied in the trough 5, and power being transmitted to the pulley 14, the members 7 are rotated in a direction to thrust and force, beat and work the pulp material forwardly to the passage 19, where it is forced into the chamber 18, and then by the thrust of the screw 17, is forced onwardly and outwardly through the die 25 into the form of a column 26, a somewhat preliminary compression being given to the pulp through this action, sufficient compression to compact and form the pulp into a column 26, as shown in Fig. 2. If desired, I may employ the trough 5 as a beater, or beat up the pulp in a separate and ordinary type of beater engine, then transferring the same to the trough 5, and either in the trough or in the beater, or both, mixing the binder desired to afterward set, solidify and harden the pulp. I may also supply the pulp directly to the chamber 18 by a pipe, chute or the like, and at a plurality of points, if deemed necessary or advisable, preferably giving an over-supply of pulp material so as to insure a compact and constant forcing outwardly of the column 26.

As shown in Fig. 2, the column 26 may be cut, sawed or otherwise severed into heel blanks, such blanks being indicated at 27, 27, and by alternating straight and inclined lines of cut 28 and 29 respectively. Such a cut blank is shown in Fig. 3, wherein the cuts 28 and 29 are shown along the top at 30 and 31 respectively, the slanting cut 29 being a rough approximation of the curved rim portion of the heel and the straight cut 28 being the face from which the heel breast 32 is afterward formed. With this blank 27, the side faces 33 and 34 are shown as the inclined portions of the truncated bear 26, narrowing to the bottom 35, thus giving a rough approximation of the heel in a vertical plane.

Fig. 4 illustrates a blank after it has been molded while still soft, wherein the top 36 is concaved to fit the heel seat of the shoe, and the heel breast 37 similarly concaved, the sides and rim being formed in desired contour, as indicated at 30. The blank thus molded, or molded and trimmed, is then dried and the binder will complete the hardening, so that it is a solid leatherlike or fiberlike integral heel. The entire heel will be light, strong, durable and wear-resisting, and can be trimmed to final shape similar to the laminated leather heel or leatherboard heel without the expense, difficulties, etc., incident to the building and use of the latter. As illustrated in Fig. 5, the completed heel blank may be finished by the addition of a toplift 39.

The completed pulp heel made by my present process is much more inexpensive to manufacture than by any prior method of which I am aware. By using a binder which will permit the pulp to be easily worked and readily formed into the preliminary shaping of Figs. 3 and 4, and then to harden, the application of heavy pressure is of secondary importance. In fact, the molding of the heel while soft and pliant, can be effected with relatively light pressure, and then the completion of the heel simply by the drying

and hardening of the binder, rendering the finished heel homogeneous, hard, and wear-resisting, greatly simplifies the process of manufacture. In my said prior process application, wherein a quantity of pulp was first separated and then formed, shaped and compressed, great difficulty has been found in handling so large a mass of pulp, as necessary to compress into a heel, while the water content was still present. A number of different binders may be used, and although I prefer one of the cellulose group, it is feasible to employ asphaltum, resin, rosin, or similar cementitious binders.

My invention is further described and defined in the form of claims as follows:

1. The process of manufacturing pulp heels, which consists in mixing the pulp material with cementitious binder, capable of hardening when drying, forcing the pulp material so mixed through a die in a continuous mass, separating heel blanks from the said mass, shaping said blanks, and then drying them, permitting the binder to harden the completed blank.

2. The improved process in the art of making non-laminated pulp heels, which consists in mixing with the pulp material a non-oxidizing and self-hardening binder, with a waterproofing substance, forcing the pulp material through a die, giving said material a preliminary compression and shaping, then severing blanks from the column of pulp thus preliminarily shaped into blanks having an approximate heel form, molding said blanks while mobile into substantially completed heel form, applying a toplift thereto and permitting the blanks to dry and harden into the finished heel.

3. The process of manufacturing pulp heels, which consists in mixing the pulp material with cementitious binder, capable of hardening when drying, forcing the pulp material so mixed through a die in a continuous mass, separating heel blanks from the said mass, shaping said blanks, and then drying them, permitting the binder to harden the completed blank, and then finely shaping the heel by compressing, trimming or the like.

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

RICHARD S. AYRES.

Witnesses:
JAMES R. HODDER,
HAROLD J. CLARK.