

Feb. 2, 1937.

H. W. MORROW

2,069,723

BASEBALL BAT

Filed Sept. 13, 1933

Fig. 1.

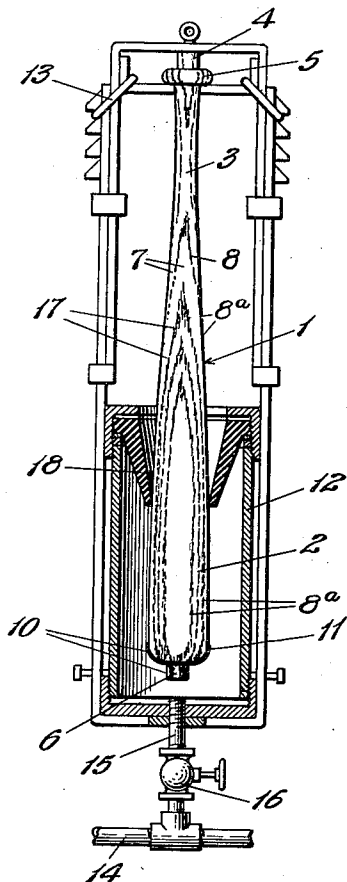


Fig. 2.

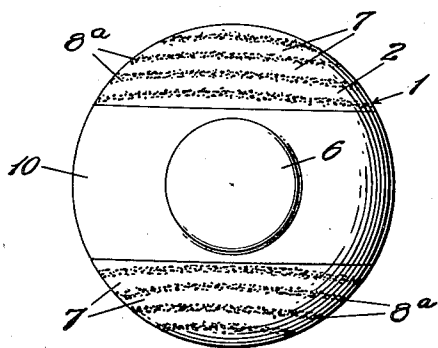


Fig. 3.

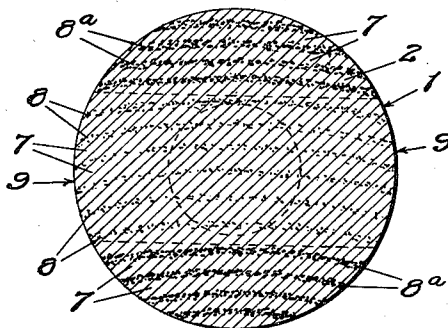


Fig. 4.

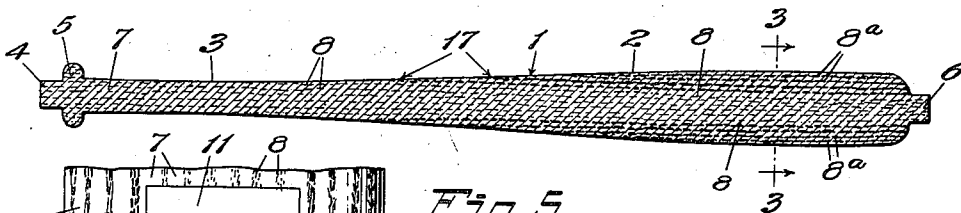
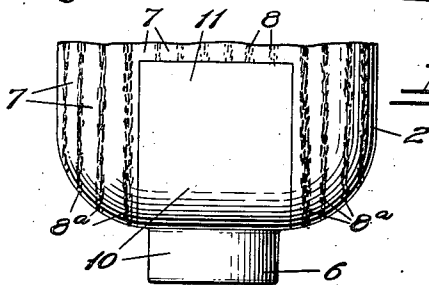


Fig. 5.



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UNITED STATES PATENT OFFICE

2,069,723

BASEBALL BAT

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Application September 13, 1933, Serial No. 689,311

3 Claims. (Cl. 273—72)

The invention relates to wood baseball bats or bat billets and processes for impregnating the same with adhesive, and has for its objects to provide certain new and useful improvements in baseball bats and processes of this character as heretofore practiced.

The present invention contemplates the provision of an improved baseball bat and a process for impregnating the same with an adhesive fluid preparation, preferably consisting of gelatin, for the purpose of securely binding adjacent layers of wood fibre together in predetermined portions only of the bat or bat billet, the adhesive solution being forced under pressure from the barrel or impact end in a direction longitudinally of the bat, and through certain of the porous cells or spring growth strata which alternate with the layers of hard wood fibre, to completely impregnate and saturate the former and securely bind the latter layers together.

By spring growth is meant the wood tissue developed in the tree during the spring of the year, such tissue being composed of larger cells and therefore more porous than the finer and more closely compacted wood tissue developed during the autumn or other seasons.

The completely impregnated and dried bat, when treated in accordance with the invention, has been found to be completely proof against the checking and splintering of the outer wood strata, an objectionable characteristic of untreated bats, due to the tendency of the wood layers to separate during use and as a result of becoming thoroughly dried out.

The present invention offers material advantages and economies and produces a bat article impregnated in a distinctive and predetermined manner, so as to obtain all of the advantages of impregnation without sacrificing any of the essential qualities of the finished bat, such as resiliency and light weight, as well as a balanced and cushioned driving power.

By this invention the treated and finished bat effectually resists chipping and peeling of the outer wood layers, common in bats which have not been so treated, and the striking or hitting area of the bat is left free of impregnating material so as to create a cushion which imparts strong driving power to the bat. The outer impregnated area of the bat barrel on each side of the unimpregnated driving surface serves to eliminate the shock to the sides of the bat which would otherwise occur during use were the striking area of the bat also impregnated.

In accordance with this invention means are

provided to prevent the impregnation by the adhesive fluid in any predetermined portion of the bat where such impregnation is undesirable and such impregnation has been found to be objectionable and of little or no value in the striking area or surface of the bat barrel. At the same time, the impregnating fluid or adhesive is introduced into between the outer wood layers of the bat barrel where its presence is desirable to prevent splintering or any tendency of said layers to separate during use or as a result of thorough drying out. By this process the finished bat may be produced at considerably less cost with an appreciable saving of adhesive, the added weight to the bat due to the presence of the adhesive is inconsiderable and of no consequence, while the natural resiliency and elasticity of the wood are retained in the striking area and are cushioned between opposed external impregnated areas. The elimination of a considerable quantity of adhesive from the striking area of the bat prevents any tendency of the bats to become top heavy and is of material benefit in the finished article which is of consequence better balanced.

When it is considered that the additional weight imparted by certain impregnating substances and processes may run as high as an ounce or more in the finished bat, and the total weight of the bat must be maintained within predetermined limits, the advantages of the present process, wherein the added weight of the impregnating fluid is not in excess of a fraction of an ounce, will be more readily apparent. This negligible variance in the weight due to the presence of the adhesive, therefore does not materially detract from the proper balance of the finished bat, viz. the proportionate weight of the barrel and handle portion.

I have found by experiment and thorough tests that a solution of gelatin is admirably suited for the adhesive material for the reason that the adhesive qualities of gelatin are excellent and its presence within the porous rings or spring growth strata between the wood layers does not have a tendency to make the wood brittle.

A further and important advantage of using gelatin rather than other adhesives, is the fact that gelatin is practically colorless and does not discolor the wood by its presence. In other words, a bat impregnated by the present invention and in certain predetermined parts thereof does not present any visual contrast between the impregnated and unimpregnated portions and to the eye of the casual observer it is not apparent that the finished bat has undergone any impregnating treatment whatsoever.

The waterproof qualities of gelatin are sufficient, when its greater adhesive characteristics are considered, to render this material admirably suited for the purpose and the finished and impregnated bat will effectually resist the entrance of moisture to between the wood layers. This resistance to the entrance of moisture is strengthened by the presence of an oil or other water repellant finish with which the finished bats are usually treated.

The herein described process may be carried out rapidly in the treatment of each bat; each bat is treated in accordance with the particular requirements necessitated by the wood characteristics of the bat; and the impregnation of the desired and restricted areas is complete and thorough in each bat treated.

The instant process is of further advantage since it serves to concentrate the impregnation with adhesive within the outer spring growth layers only of the bat at the upper and lower sides when the bat is properly held by the player, i. e. with the grain of superposed wood layers horizontal or parallel to the ground, and the longitudinally extending edges of the wood layers presented to the impact of the ball. With the bat properly held as described, it is desirable to strike the ball at the central or unimpregnated area of the barrel portion where the maximum amount of resiliency and cushioned driving power is imparted to the ball. The tendency of the bat to split or peel may occur when the ball strikes the bat above or below the desired driving area described. This would be in the nature of a glancing blow against the relatively vulnerable and narrow outer wood layers, and such tendency of the wood to separate or splinter is effectually resisted by the presence of adhesive in such outer portions of the bat barrel. When the ball strikes the center of the bat squarely and between the impregnated areas, there is no appreciable tendency to split or separate the wood layers.

The complete middle or striking zone and surface of the bat is maintained in its natural resilient condition, not only in the barrel portion, but the nature of the process is such that the entrance of impregnating fluid to the handle portion, where its presence is unnecessary, is adequately prevented. The saving of impregnating material, preferably gelatin, when the process is carried out in accordance with the instant invention, is an important economical measure.

When gelatin is employed as the impregnating material, in view of its greater adhesive qualities, and other described advantages, the disadvantages of drying out the finished bat are materially reduced, thereby obviating the necessity of employing special precautions during drying, and it will be noted that the relatively smaller impregnated area as compared to a completely impregnated bat, promotes uniform drying out and eliminates uneven shrinkage, swelling or cracking.

As a result of the instant process the impregnated bats may be used on the 4th day after being treated which is a distinct advantage. The present process obviates the necessity for protecting the ends of the treated bats by means of a paper sack or other protecting medium to guard against cracking or checking. As a further advantage in the present process there is very little swelling of the bat after impregnation, or stated in other words after four days the impregnated bats regain their normal shape and weight. It will be obvious that this is an im-

portant practical advantage resulting from the process.

With the controlled impregnated areas of the present process, there is no point reached by the impregnating fluid which is more than an inch from the surface of the bat and the average distance of the points reached by the adhesive is probably less than one-third of an inch from the surface so that the drying out is accomplished rapidly and is not of more than four days' duration.

With such objects in view, as well as other advantages which may be incident to the use of the improvements, the invention consists in the process and product thereof hereinafter set forth and claimed, with the understanding that the several necessary elements constituting the same may be varied in proportions and arrangement without departing from the nature and scope of the invention.

In order to make the invention more clearly understood there are shown in the accompanying drawing means for carrying the same into practical effect, without limiting the improvements, in their useful applications, to the particular constructions which, for the purpose of explanation, have been made the subject of illustration.

In the said drawing:

Fig. 1 is a side view, partly in vertical section, of a baseball bat or partially turned bat billet in adjusted position within a bat treating tank for impregnation in accordance with the present invention.

Fig. 2 is an enlarged end elevation of the baseball bat or billet looking from the barrel end thereof, and showing the location and arrangement of the sealed area thereof relative to the grain or superposed and substantially parallel wood layers of the bat.

Fig. 3 is a transverse sectional view on line 3-3 of Fig. 4, through the barrel portion of a bat or billet impregnated in accordance with the invention.

Fig. 4 is a central longitudinal section on a reduced scale of a baseball bat or bat billet constituting a part of the present invention, and which has been treated in accordance with the improved process.

Fig. 5 is a fragmentary view in side elevation on the same scale as Figs. 2 and 3 and further indicating the location and extent of the sealed area or zone of the bat relative to the grain and diameter thereof, the bat being viewed at right angles to its position in Fig. 1.

The new and improved process as hereinafter described may be carried out with respect to either a completely turned and finished bat, or a partially turned bat billet which is subject to further turning and finishing operations.

In the illustrated embodiment a partially turned bat billet is subjected to the impregnation treatment, but it will be understood that a completely turned bat may be treated without any substantial or material variation of the process, and the illustrated bat billet may therefore be hereinafter referred to as a bat.

Referring to the drawing, the bat or billet is shown at 1 and comprises an enlarged barrel or impact portion 2 and a reduced or tapered handle portion 3. In the instance of a partially turned billet an integral projection or knob 4 is present adjacent the annular enlargement 5 constituting the outer extremity of the bat handle.

This projection 4 is designed to be engaged by

a lathe spur in turning down the billet and completing the bat, and a similar knob or projection 6 for engagement with the lathe is present at the opposite or barrel end of the billet. The grain of the bat is indicated generally at 7 and consists of superposed layers of tough, compact fibrous wood substance, and alternating therewith are the relatively porous and less dense layers or strata 8 constituting what is generally termed the spring growth of the wood through which sap is conducted during each succeeding year of the tree's growth. Because of their porous nature and lighter texture the pore rings or spring growth layers 8 of the bat are capable of substantially complete penetration, saturation and/or impregnation by various adhesive compositions of varying fluid consistencies, which may be forced under pressure into the bat, preferably in a longitudinal direction and from the barrel or impact end thereof.

Baseball bats are preferably constructed of selected hard and lightweight timber in which the grain or fibrous wood layers run in substantially uniform or straight lines and are free from knots or undue irregularities in the thickness and contour of the superposed layers of wood fibre.

In the drawing, the bat is illustrated as constructed of selected hard wood in which the grain or layers of wood fibre are of substantially uniform thickness and extend in substantially straight lines longitudinally of the bat from end to end thereof. Such preferred wood texture produces a bat which is more resistant to breakage during use and is otherwise possessed of the desirable resilience and durability in service for an indefinite period.

In use the bat is properly held by the player with the grain or strata of superposed layers 7 of wood substance lying in a horizontal plane as best seen in Figs. 2 and 3. When held in this manner, with the grain parallel to the ground, the striking portion and surface of the bat, indicated at 9 in Fig. 3, consists of the central layers of wood fibre 7 and alternate porous layers or rings 8, together constituting the greater portion of the cross-sectional area of the barrel portion 2. In accordance with this invention these central porous layers 8, which constitute the spring growth of the tree during life, are not impregnated with adhesive but are left free and unobstructed for the entire longitudinal extent of the bat from the barrel to and including the handle end 3, as best seen in Fig. 4, while the outer disposed porous rings or layers 8a at the upper and lower portions of the bat barrel 2, relative to the striking portion, (Fig. 3) are completely and thoroughly impregnated with adhesive by the present invention, to obtain the desired and described advantages in the finished bat.

In order to produce a finished bat or bat billet partially impregnated in a predetermined manner and to the extent described and illustrated, I provide a sealed and impermeable area or zone 10 at the barrel end of the bat or billet. As best seen in Figs. 2 and 5 this sealed area 10 consists of a band, stripe or strip of substantial width which extends diametrically entirely across the barrel end of the bat and thence upwardly over the side walls thereof for a limited distance as indicated at 11. To produce a bat treated in accordance with the improved process it is not necessary to extend the sealed area for any appreciable distance along the side walls of the bat, it being sufficient to terminate the same

shortly above the bat end as shown in Fig. 5. When a partially turned bat billet is treated, this sealed zone includes the entire surface area of the lathe knob or projection 6 at the lower end of the bat and the nature and composition of the coating of sealing material is such that the same is impervious to fluid with the result that no adhesive or impregnating fluid is admitted into the porous spring growth layers of the bat barrel through and beneath or in axial alignment with such sealed area, for the entire longitudinal and transverse extent of the bat.

The sealed area or zone 10 may be provided on the barrel end of the bat in any preferred manner. For example a wax layer or coating, preferably having the dimensions and location shown in Figs. 2 and 5, is applied to the barrel end of the bat to completely seal the porous rings 8 throughout the central portion of the bat, or appropriately disposed adhesive tape or the like may be employed for the purpose. Any impermeable material, such as paint or varnish, or an impermeable fabric, such as court plaster, may be employed for the purpose of providing a sealed zone 10 in the area indicated at the barrel end of the bat, it merely being necessary to employ a material or composition which is impervious to the passage of the impregnating solution when the same is forced under pressure into the porous rings 8a longitudinally of the bat barrel and from the impact end thereof.

It will be observed from the drawing that the sealed area 10 is disposed diametrically of the bat for the entire width thereof and is parallel to the grain of the bat as distinguished from transversely thereof. In this manner the outer spring growth layers 8a only of the bat barrel will be impregnated by the improved process, and such impregnated area throughout the barrel portion is constituted of the upper and lower porous rings only when the bat is properly held by the player (Fig. 3), while the central area of the bat barrel and the handle portion is left free and unimpregnated for the entire longitudinal and transverse extent of the implement.

When impregnating a bat or billet in accordance with the present invention, the bat is first provided with a sealed area 10 at its barrel end, the same consisting of a layer or coating of wax or other impermeable and imperforate material or fabric, said sealed area being located as described to extend across and over the end of the bat and upwardly for a short distance along the side walls or striking surface of the bat barrel. The bat with the sealing material applied thereto is next positioned or inserted within an individual pressure treating tank or tube 12 and is locked in position therein by means of suitable removable clamping devices indicated at 13. The clamping devices 13 serve to prevent the bat from being expelled from the tank by the pressure of the fluid which may be substantially 200 lbs. to the square inch, during the impregnating process. An adhesive solution, preferably consisting essentially of gelatin, and which may be in the proportion of one part gelatin dissolved in eight parts of water, is supplied under pressure to the interior of the tank 12 by means of a fluid pressure supply line 14, communicating with a source of fluid under pressure (not shown) and branch pipe 15, the latter having a valve 16 for controlling the delivery of adhesive to the tank 12. When the tank 12 is filled with adhesive and further supply is prevented by the ca-

capacity of the tank, the continuance of pressure from line 14 will result in the adhesive being forced into the exposed spring growth layers 8a on either side of the sealed area at the lower end of the bat barrel, as best seen in Figs. 1 and 5. The adhesive is caused by continued pressure to penetrate all of the outer porous growth layers 8a which terminate in the tapered portion of the bat and is driven longitudinally of the same throughout the bat barrel until the entire extent of the exposed porous growth layers 8a has been traversed, after which the gelatin material will exude from the upper ends of the respective porous rings 8a at the opposite ends thereof at an area substantially midway of the bat and adjacent the handle portion, indicated at 17 in Fig. 4. The entire time for the complete impregnation as described may be from one to three minutes, depending upon the character and moisture content of the wood, viscosity of the fluid, degree of pressure and other considerations.

Since there is an appreciable taper in a baseball bat due to the enlarged diameter of the barrel or impact portion as compared to the handle portion, the outer porous growth rings 8 of the barrel have their ends exposed and come to the surface at various locations intermediate of the bat, as indicated at 17 and as best seen in Figure 4. It is at these exposed terminating portions 17 of the outer wood layers (Figs. 1 and 4) where the tendency to chip and peel is most pronounced. The present process, wherein there is no obstruction to the entrance of the adhesive, completely fills the porous wood growths with adhesive until the latter exudes at the terminating points 17, which results in effectually binding the wood layers together and insuring against such described chipping or separation.

The supply of fluid is then shut off by manipulation of the valve 16 and the bat may be released from the clamping mechanism and removed from the tank, any surplus fluid being thereafter removed from the surface. The frictional engagement of a heavy rubber or other flexible gasket 18 with the periphery of the bat barrel within the tank 12 prevents any leakage of the fluid from the tank along the surface of the bat, and the only source of escape of the fluid under pressure after the tank 12 is filled, is through the outer exposed porous rings 8a on opposite sides of the sealed area 10, which latter prevents the entrance of any fluid into the central or intermediate porous layers 8 of the barrel.

By the described process it will be observed that it is impossible to trap any air in the impregnated pore rings since one end only of the bat is submerged in the treating tank, the outer or handle portion being exposed only to atmospheric pressure, thereby permitting expulsion of entrained air and the unobstructed travel of the fluid under pressure through the outer pore rings 8a of the barrel and for their longitudinal extent until said pore rings on each side of, or above and below the centrally located striking portion 9, have been completely impregnated with the adhesive fluid.

It will be noted that the unimpregnated area 9 of the bat extends transversely of the bat barrel from side to side thereof, there being no adhesive present at the peripheral portion of this central area. Therefore there is no possibility of trapping any moisture within the area 10 with consequent danger of splitting the relatively impervious impregnated area in the event the cen-

tral portion should swell due to the presence of such moisture. The exposed surface of the unimpregnated area 9 permits the free entrance and exit of moisture without affecting the outer impregnated area or bat as an entirety and permits free expansion and contraction of the bat transversely of the grain. This is in contrast to prior structures in which the impregnated portion of the bat constitutes an unyielding shell enveloping the elastic unimpregnated core, the swelling of which due to the presence of moisture has a tendency to burst the outer impregnated layers.

According to the present invention the adhesive fluid is forced longitudinally of the bat with no resistance at the upper or exposed end of the bat. Therefore there is no tendency for the adhesive to enter the porous wood growth layers 8 in a lateral or transverse direction within the tank and above the sealed area 10. This lack of tendency for lateral penetration of the adhesive is further in view of the comparatively short time when pressure is applied, for example, one minute. By localizing the areas of impregnation as described there is no possibility of any of the impregnating fluid entering the handle section due to the pressure being maintained for longer than is necessary. Any excess of the impregnating fluid would necessarily flow out of the exposed ends of the summer growth layers 8a at or near the locations 17 in the tapered section of the bat.

The invention is not limited to providing an unimpregnated area of the exact diameter or configuration shown in the drawing, and it will be understood that such unimpregnated area may be varied in proportions and configuration, it merely being necessary and essential that such unimpregnated area extend entirely through the bat barrel transversely thereof.

It is thought that the invention and many of its attendant advantages will be understood from the foregoing description, and it will be apparent that various changes may be made in the form, construction and arrangement of the parts without departing from the spirit and scope of the invention or sacrificing all of its material advantages, the form hereinbefore described being merely a preferred embodiment thereof.

What is claimed is:

1. A wood baseball bat having a barrel or impact portion and a handle portion and constituted of superposed substantially parallel layers of wood fibre alternating with superposed layers of porous growth rings, the outer porous layers above and below the centrally disposed striking portion of the bat barrel being impregnated with a gelatinous adhesive to firmly bind and secure the alternating outer layers of wood fibre together, and said centrally disposed striking portion of the bat barrel being unimpregnated and free of adhesive for its entire width from side to side of the bat barrel and throughout the longitudinal extent of the barrel and handle portions, whereby the striking portion of the bat barrel is maintained cushioned for driving power and the outer wood layers above and below said striking portion are held against separation and cracking by said adhesive, throughout the longitudinal extent of said barrel portion.

2. A wood baseball bat having a barrel or impact portion and a handle portion and constituted of superposed layers of wood fibre alternating with superposed layers of porous growth rings, the outer porous layers above and below the centrally disposed striking portion of the bat barrel being

5 impregnated with adhesive to firmly bind and se-
cure the alternating outer layers of wood fibre
together, and said centrally disposed striking por-
tion of the bat barrel retaining the natural char-
acteristics of the wood and left free of adhesive
10 for its entire width from side to side of the bat,
whereby the striking portion of the bat is main-
tained cushioned for driving power and the outer
wood layers above and below said striking por-
tion are held against separation and cracking
by said adhesive.

3. A wood baseball bat comprising opposed
outer zones having the porous growth layers

thereof impregnated by an adhesive forced lon-
gitudinally therethrough, and an intermediate
zone having the porous growth layers thereof
unimpregnated, said intermediate zone extending
diametrically throughout the width of the bat 5
and parallel to the growth layers thereof from
one impact side to the opposite impact side,
whereby said bat is capable of unimpaired ex-
pansion in a direction normal to said growth
layers caused by concussion or by the swelling 10
of the unimpregnated intermediate zone.

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