

F. WECKERLY.
COMPOSITION OF MATERIAL FOR AND PROCESS OF MANUFACTURE OF RAILROAD TIES, POSTS,
AND SIMILAR ARTICLES.

APPLICATION FILED MAY 25, 1907.

Patented Sept. 7, 1909.

933,145.

Fig. 4

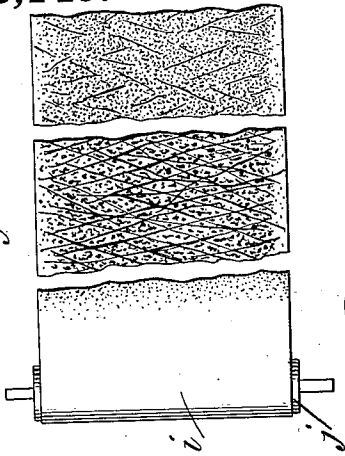


Fig. 3

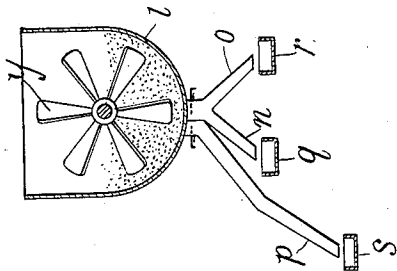


Fig. 1

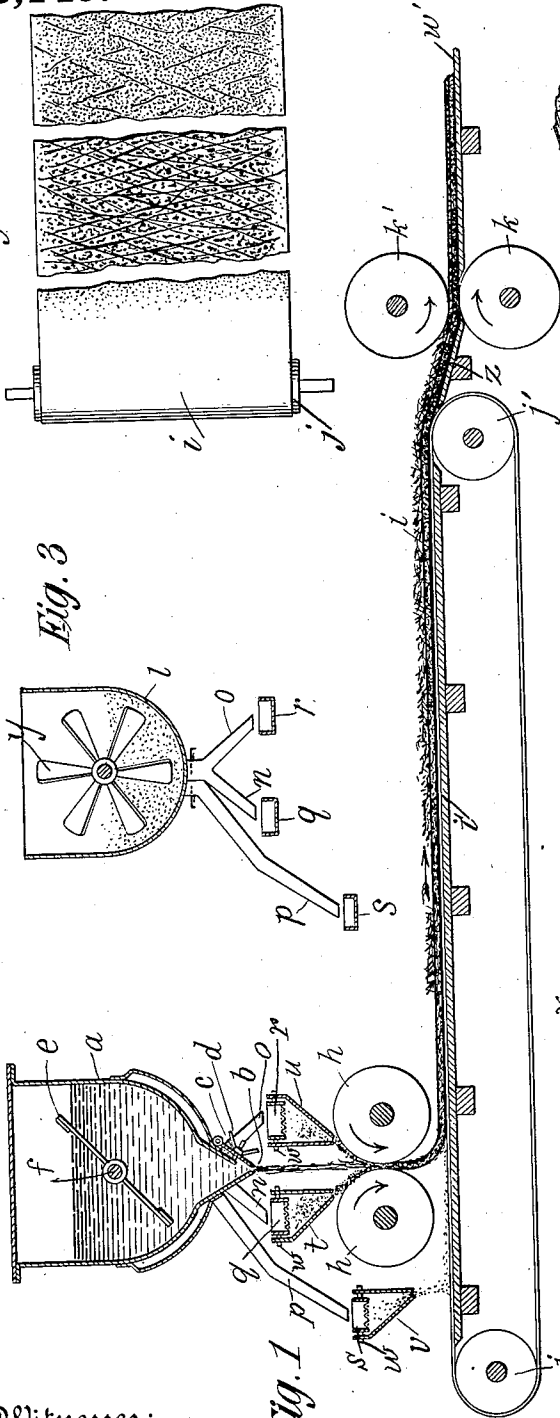


Fig. 5

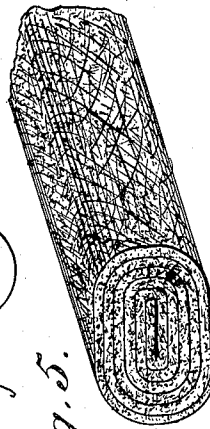


Fig. 2

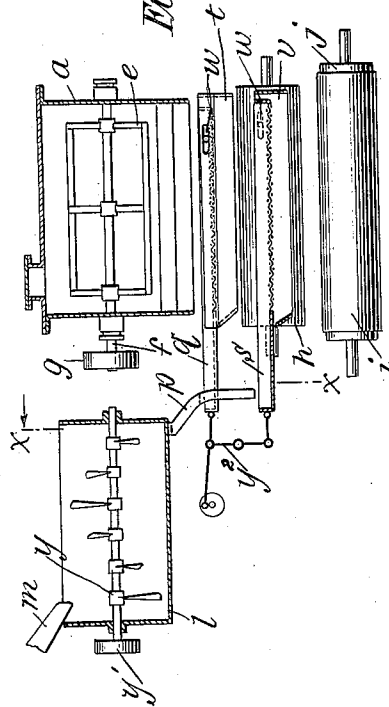


Fig. 6



Witnesses:
Raphael Ketter
V. Braun

Frank Weckerly
Inventor
By his Attorney
Schreier & Mathews

UNITED STATES PATENT OFFICE.

FRANK WECKERLY, OF ST. DAVIDS, PENNSYLVANIA.

COMPOSITION OF MATERIAL FOR AND PROCESS OF MANUFACTURE OF RAILROAD-TIES,
POSTS, AND SIMILAR ARTICLES.

933,145.

Specification of Letters Patent.

Patented Sept. 7, 1909.

Application filed May 25, 1907. Serial No. 375,618.

To all whom it may concern:

Be it known that I, FRANK WECKERLY, a citizen of the United States, and a resident of St. Davids, county of Delaware, and State of Pennsylvania, have invented certain new and useful Improvements in Composition of Material for and Process of Manufacture of Railroad-Ties, Posts, Pipes, and Similar Articles, of which the following is a full, clear, and exact specification.

This invention relates to manufacture of railroad ties, posts, pipes and similar articles, of comparatively long, coarsely separated vegetable fibers, bound together as hereinafter more fully described, and consists (1) of the novel composition of binding or cementing material for such fibers; and (2) of the process of compounding the binding or cementing material and the process of manufacture of such articles. The vegetable fibers employed for the manufacture of such ties, posts, pipes and similar articles according to my invention, are obtained of roughly crushed (not broken) stems and leaves of coarse grass, preferably such as grows in salt marshes, palmettos, straw, cornstalks, reeds and the like. The fibers may be prepared in any suitable manner, bearing in mind, that it is not necessary to free the fibers from the incrusting substances and that it is desirable to preserve, as much as possible, their longitudinal continuity. The best way of preparing such fibers is by passing the stems, reeds, etc., lengthwise between compressing rollers having somewhat roughened surfaces.

The binding or cementing material is made up of coal-tar, approximately 26 parts measured by volume, hard pitch, approximately 26 parts, and dead oil, approximately 10 parts, combined in suitable proportions with a dry filler such as brickmeal, crushed slag, finely crushed siliceous slate and other similarly composed substances. The object of combining coal tar and hard pitch with the stated siliceous substances for this binding or cementing material, is to obtain the preservative action of the higher phenols, contained in the dead oil, upon the vegetable fibers, while producing a binding medium of such permanent consistency and yielding quality as is required for the intended use of the composition. If the vegetable fibers,

used in the composition would not be preserved so as to protect them against rotting, the material produced would not be capable of such use, as it would not be durable. And again, if the cementing compound would not be made of the requisite and permanent consistency and yet yielding, the resulting material could not be used for its intended purposes, because it would not be capable of being worked by tools, would not permit driving of nails, spikes into it or hold them against the strains. Such material would also be subject to changes by variations in temperature and atmospheric influences. The preservative effect upon the vegetable is obtained by the action of the higher phenols contained in dead oil in free state. This condition of these higher phenols, and their preservative capacity upon the vegetable fibers, are preserved by combining hard pitch, itself a product of coal tar, and nearly always containing some dead oil itself, but not having any chemical influence upon the constituents of dead oil, and particularly upon the higher phenols, and by the use of such siliceous material as slag, brickmeal or slate as the filler, which has no effect whatever upon the higher phenols contained in the viscous components of the cement. Such siliceous material is therefore eminently suitable to be used to effect the necessary thickening of the cement, besides having the capacity of effecting this thickening of the cement so that the consistency of the resulting product is permanent, well capable of being regulated according to the mean temperature of the locality where such material is to be used, and not liable to be changed by ordinary variations in temperature as occur by changes in season or climate. The proportion of dry filler will vary according to whether brickmeal, crushed slag or finely crushed slate is used. Crushed slag is best suitable owing to its capacity to unite more intimately with the other ingredients of the cement and owing to its possessing nearly the same specific gravity. The use of crushed slag results in producing a greater bulk by less weight and what is more important a much more homogeneous mass than either of the other dry filler materials. Brickmeal is nearly equally well suitable, though its specific gravity is greater and its capacity to

combine intimately with the bituminous ingredients of the cement less than that of crushed slag. Of crushed slag 65 to 75 parts, measured by weight, may be used; of brick-meal approximately 60 to 65 parts, whereas
 5 of finely crushed slate not more than 60 parts should be used. The compounding of these materials in the proportions stated, results in producing, in combination with the
 10 vegetable fibers, a material possessing those of the characteristic properties of wood, such as elasticity, tensile strength, capability of being worked by tools and to resist such crushing and torsional strains as are exerted
 15 on railroad ties by the running of trains, which render it particularly available for use in manufacture of such railroad ties and similar articles. The compounding of the binding or cementing material of the substances hereinbefore enumerated, and in the
 20 stated proportions, results also in imparting to such materials about the same specific gravity as the kind of woods used for such purposes, when impregnated with creosote compounds, and in addition thereto a greater
 25 degree of resistance to decay or disintegrating under atmospheric influence, and greater durability in such use, than wood treated with any preservative compound known to
 30 me.

The ingredients, composing the cement, are prepared and mixed as follows:—The tar is heated to about 165° F., the dead oil is added thereto and thoroughly mixed; the
 35 hard pitch is pulverized and thoroughly mixed with the dry filler. The heating of the tar, and the mixing therewith of the dead oil, is done in a vat set upon a suitably constructed furnace, and so arranged that the
 40 liquid mass may be continuously drawn therefrom in such wide and thin flow as the process of manufacture of such railroad ties, posts, pipes and similar articles requires. The pulverized pitch and the dry filler are mixed
 45 by a mechanical apparatus set in a trough provided with means for continuously discharging two substantially even layers of the mixture, one layer upon each of two rollers, set underneath quite closely together
 50 and slowly revolving toward each other. These rollers must be set in such position, that the flow of the liquid mixture of the heated tar and dead oil may be conveyed between them. By these means the ingredients
 55 of the binding composition are compounded together and simultaneously formed into a moving continuous layer. This layer of the binder or cementing material as it emerges from between the rollers, is conveyed continuously toward another set of compressing
 60 rollers, and while thus in transit, the fibers, stems, straw, cornstalks, etc., whichever of these materials are used, are laid thereon across the width of the layer and so as to
 65 intersect with each other, but never at right

angles with each other, or with the layer; the idea being that the stem reeds or stalks while they should intersect with each other should never lie parallel to the line of motion of the layer of the cementing material,
 70 and this intersecting is to be effected by alternately slightly deviating from a line at right angles to the line of motion of the moving layer. The layer of the binding composition with the fibers thus laid thereon
 75 is then again run between slowly revolving compressing rollers, upon which there is also constantly being deposited a thin layer of the dry filler, finely pulverized to prevent the material from adhering thereto. In this
 80 manner, there is formed a continuous layer of my improved material for manufacture of railroad ties, posts, pipes and the like, and this layer is preferably formed slightly wider than the desired length of the ties,
 85 posts, etc. This layer is formed while yet flexible, into such ties, posts, etc., by winding it upon a mandrel until the coil attains the requisite thickness. Then it is cut off, its ends trimmed and the roll compressed in
 90 forms as may be required to give to it any desired shape. Instead of winding the continuous layer upon a mandrel, it may be folded upon itself and then compressed. Such method is preferable when the product
 95 is to be used in sheets or strips.

The arrangement of the mechanical devices for carrying on my improved process is shown, conventionally illustrated in the accompanying drawing, wherein—

Figure 1 is a sectional elevation of a diagram of such a machine as may be used for carrying on this process; Fig. 2 is an end view, partly sectional (looking toward the right of Fig. 1), showing the parts of the
 100 machine employed for preparing and rolling the binding layer; Fig. 3 is a sectional view of the dry mixing trough taken on line *x—x*, indicated in Fig. 2; Fig. 4 is a plan view of a part of the conveyer showing, in the first fraction, the rolled layer of the binding composition, in the second fraction, the reeds or other similar material deposited thereon before being compressed together
 105 with the binding layer, and in the third fraction, the sheet compressed; and Figs. 5 and 6 are illustrations of such products manufactured according to my improved process.

The machine comprises a vat *a* having a narrow opening *b*, extending the entire length of its bottom. The width of the opening is made adjustable by the hinged drop or gate *c* and adjusting screws *d*. A mechanical stirrer or mixer *e* is mounted in the vat. Its shaft *f* is extended outside of the vat and a driving pulley *g* is keyed to it on one end. A second vat or trough *l* (shown separately in Fig. 3) is placed to one side of the vat *a* (see Fig. 2). A stirrer or mixer *y* is mounted in this trough *l*. Its
 120
 125
 130

shaft projects from the trough and a pulley y' is set thereon for driving it. A chute m is arranged above this trough and at one end of it for conveying into it the materials to be mixed therein, and on the other end of the trough three outlet chutes n, o, p are connected to suitable openings in its bottom. These chutes lead to sieves q, r, s respectively. The sieves are arranged above troughs t, u, v , and are secured at one end to the troughs by pivotal connections w . The pivots pass through elongated holes or slots formed in the end of the troughs t, u, v , to permit a slight oscillating motion of the sieves, and an agitator y is secured to the other ends of the troughs t, u, v , to give to them a short and comparatively rapid oscillating motion. The troughs are V-shaped at the bottom, and have a narrow opening extending the entire length of their bottoms. Troughs t, u , are located above and a little within the center lines of the rollers $h-h$, and trough v is at the rear of the rollers above the rear end of the apron i described farther on. Underneath the vat a and at a suitable distance below it, two compressing rollers $h-h$ are mounted, one on each side of the opening b , and provided with suitable driving gear. Below these rollers an endless apron i is stretched upon two rollers j, j' , and driven to move in the direction indicated by an arrow in Fig. 1. Apron i is supported on platform i' to prevent its sagging underneath the weight of the material carried thereon and to facilitate the manipulations thereof.

Adjoining roller j' an inclined platform z is arranged forming a take-off for the layer of the material and a bridge for conveying it to the compressing rollers k, k' . These rollers are arranged one above the other, the lower roller k , being mounted in fixed bearings while the upper roller k' , is mounted in bearings set in slideways and suspended upon tackle by which it may be raised and lowered and, if need be, partly balanced to regulate the pressure upon the sheet rolled between them. Beyond rollers k and k' there may be a winding mechanism or a platform w' as shown in the drawings for folding the sheet upon itself. This will be governed by the requirement of the manufacture for which the sheet is to be used.

By this process of manufacture the fibers embedded in the bituminous cement impart to the product such tensile strength and elasticity as natural wood of the kind, used for the manufacture of such articles, possesses, while the cementing mixture absolutely protects the fibers against the deteriorating influence of moisture and atmospheric air and also against insects, fungus and other parasitic growth.

The product resulting from this process is somewhat heavier than wood, but equally if

not more resistant against crushing or compressing, even if made hollow, which it may be made, safely, whenever desirable to reduce its weight. The material will safely withstand as high temperature as wood, used for such purpose, and will not soften when once hardened or set. It is most suitable also for manufacture of water and sewer pipes, gas mains and electrical conduits and particularly for manufacture of conduits and for constructing or lining of tanks used for storing and conveying of corrosive chemicals.

I claim as my invention:—

1. A binding or cementing material compounded of coal-tar, dead oil, hard pitch and crushed siliceous material, substantially as herein set forth.

2. A binding or cementing material compounded of coal-tar, dead oil, hard pitch and crushed slag, substantially as herein set forth.

3. A binding or cementing material compounded of approximately 26 parts, measured by volume, of coal-tar, 10 parts of dead oil, 26 parts of hard pitch and of a suitable quantity of crushed siliceous material, substantially as herein set forth.

4. A binding or cementing material compounded of approximately 26 parts, measured by volume, of coal-tar, 10 parts of dead oil, 26 parts of hard pitch and 65 to 75 parts of crushed slag, substantially as herein set forth.

5. The process of compounding and preparing for use a binding or cementing material of coal-tar, dead oil, hard pitch and of a dry filler, consisting of following steps:— (1) heating the tar, adding thereto of the dead oil and thoroughly mixing the composition; (2) pulverizing the hard pitch and mixing it with the dry filler; (3) forming the mixtures of the liquid and of the pulverulent ingredients into alternating layers, and (4) compressing the layers together.

6. The process of compounding and preparing for use a binding or cementing material of coal-tar, dead oil, hard pitch and a dry filler, consisting of following steps:— (1) heating the tar, adding thereto of the dead oil and thoroughly mixing the composition; (2) pulverizing the hard pitch and mixing it with the dry filler; (3) forming the mixture of the dry ingredients in substantially evenly thin and continuous layers; (4) conveying the heated mixture of the liquid ingredients in a substantially continuous and evenly thin flow between the layers of the dry ingredients, and (5) compressing the layers together.

7. Material for making articles of manufacture composed of coarsely separated vegetable fibers and a composition of coal-tar, dead oil, hard pitch and a dry filler, substantially as herein set forth.

8. Material for making articles of manu-

facture composed of coarsely separated vegetable fibers and a composition of coal-tar, dead oil, hard pitch and a siliceous material, substantially as herein set forth.

- 5 9. Material for making articles of manufacture composed of coarsely separated vegetable fibers and a composition consisting of

coal-tar, dead oil, hard pitch and crushed slag compounded substantially as herein set forth.

FRANK WECKERLY.

Witnesses:

EDGAR C. VAN DYKE,

MARY F. SMITH.