(No Model.)

G. YULE & G. ATHERTON.

METHOD OF AND APPARATUS FOR FORMING AND STICKING NAPPING BATS.

No. 260,918. Patented July 11, 1882.

Fig. 1.

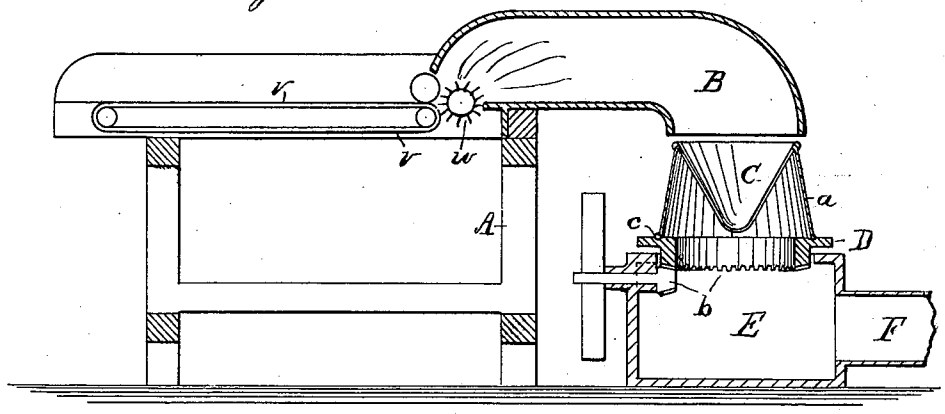


Fig. 4.

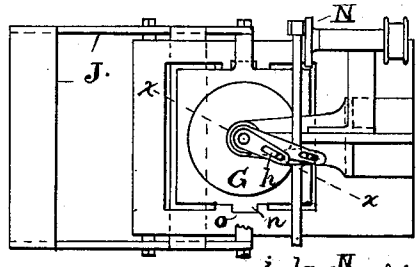


Fig. 2.

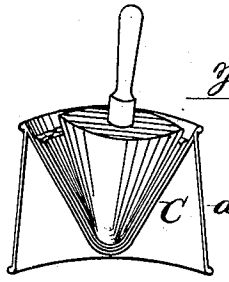


Fig. 6.

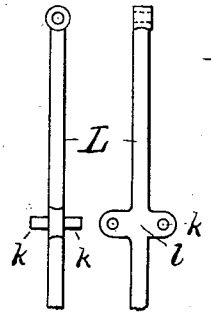


Fig. 3.

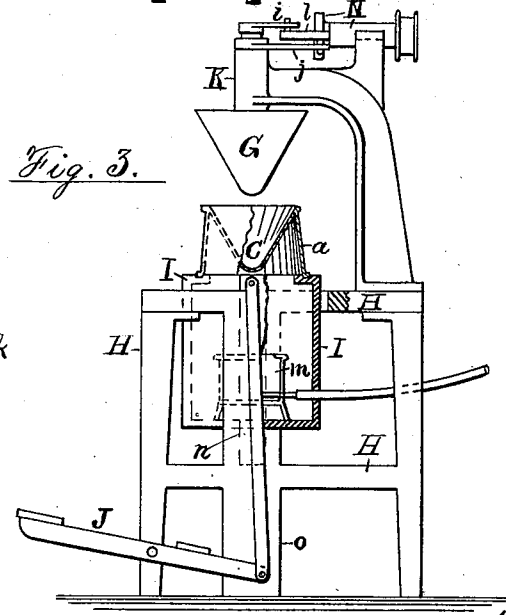
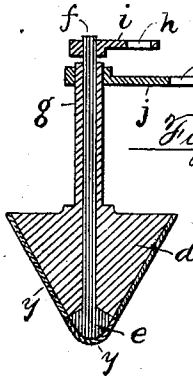


Fig. 5.



Attest:

W. T. Cole

Thos. H. Howard

Inventors.

Giles Atherton and G. Yule

per Thos. S. Crane Atty.

N. PETERS. Photo-Lithographer. Washington, D. C.

UNITED STATES PATENT OFFICE.

GEORGE YULE, OF NEWARK, NEW JERSEY, AND GILES ATHERTON, OF STOCKPORT, COUNTY OF CHESTER, ENGLAND.

METHOD OF AND APPARATUS FOR FORMING AND STICKING NAPPING-BATS.

SPECIFICATION forming part of Letters Patent No. 260,918, dated July 11, 1882.

Application filed February 21, 1882. (No model.)

To all whom it may concern:

Be it known that we, GEORGE YULE, a citizen of the United States, and GILES ATHERTON, a subject of the Queen of Great Britain, residing, the said YULE in Newark, Essex county, New Jersey, and the said ATHERTON in Stockport, Chester county, in Great Britain, have invented certain new and useful Improvements in Method of and Apparatus for Forming and Sticking Napping-Bats, fully described and represented in the following specification and the accompanying drawings, forming a part of the same.

This invention relates to an improvement in forming and sticking napping-bats to hat-bodies; and it consists, first, in forming the bats upon the interior of a perforated cone and sticking the hat-bodies thereto inside the cone; second, in placing a hat-body inside the bat before its removal from the cone and sticking it to the bat by vibrating or rubbing mechanism, as described herein; third, in sticking the hat-body to the bat while inside the forming-cone, and subsequently applying a suitable rubbing device to the tip apart from the forming-cone; fourth, in certain combinations of mechanisms for carrying out the above-mentioned processes.

The invention will be understood by reference to the annexed drawings, in which Figure 1 is a sectional side view of a forming-machine with the details omitted which are not claimed herein. Fig. 2 is a view of the cone and bat with a hat-body and conical rubber inserted therein. Fig. 3 is a partly-sectional elevation of a machine for sticking the hat to the bat in its forming-cone, and Fig. 4 is a plan showing the means for vibrating a compound cone in separate parts. Fig. 5 is a section of the sectional cone on line *x x* in Fig. 4, its surface being shown as provided with a jacket, *y*. Fig. 6 is an enlarged view of rod L.

The forming of the bat inside the forming-cone instead of upon its exterior or upon other shaped surfaces, as has heretofore been done, is an operation that can be performed with a great variety of mechanism, but possesses peculiar advantages, however it may be effected.

As shown in the drawings, the forming-machine is merely indicated by the frame A and the feeding-apron *v* and picker-roll *w*, the driving mechanism all being omitted, as its construction is well known.

A novel feature in the construction of the mechanism is the provision of a perfectly-closed trunk, B, arranged to conduct the fur-blast to an inverted hollow perforated cone, C, placed upon a revolving table, D, adjacent to the trunk and operating to discharge the fur into the open mouth of the cone. The latter is shown provided with a casing, *a*, which incloses the outer surface of the cone at a sufficient distance from the same to admit a circulation of air.

The table is connected by a suction-box, E, and pipe F to any ordinary means for exhausting the air from the casing *a*, and thus attracting the fur to the interior of the cone. The table is shown provided with gearing *b* for rotating it, as usual, and the casing is fitted to a groove, *c*, upon the table, as usual. By this construction the cone can be removed by merely lifting it from the groove and sliding it from beneath the trunk B. When thus removed, with the bat inside it, a hat-body can be placed within the bat, as in Fig. 2, and the same subjected to any mechanism operated by power, as shown in Fig. 3, or by hand, as shown in the conical rubber P, (seen in Fig. 2,) for vibrating or agitating the hat-body under pressure in contact with the nap-bat, such agitation resulting in a perfect adhesion of the bat to the hat-body, as is technically called "sticking."

When an oscillating conical rubber, G, such as is shown in Fig. 3, is employed, the same operates less upon the tip of the hat than elsewhere, if made in one piece, and we have therefore employed various tip-rubbing devices to harden and stick the tip of the bat in such case. The nature of such devices is immaterial, provided they produce a movement upon the tip equivalent to that which is applied to the sides.

To obviate the use of such tip-rubbers, which may be applied to the hat and bat either before or after removal from the hollow cone, we have devised a sectional rubbing-cone, by the use of which a nearly equal agitation is imparted to the bat throughout. The same is shown in section in Fig. 5, and is constructed by making the body of the rubber with a tubular vibrating and supporting shaft, and forming the point of the cone detached from the body and connected with a central shaft passed through the tubular one to receive the desired movement. By this arrangement, in which *d* is the body, *e* the tip of the cone, *g* the tubular shaft, and *f* the

central shaft, the point of the cone can be vibrated through a much greater angle than the body to compensate for its diminished diameter.

The means for applying the rubber to the body and bat are shown in Fig. 3, in which the machine is shown partly in section at the center line of the forming-cone C.

His the frame of the machine, sustaining the vibrating rubbing-cone G at a fixed level, and provided with ways or vertical guides, in which a carriage, I, supporting the cone C, can be elevated at pleasure by a treadle, J.

The cone G is shown carried by a vertical bearing, K, and is provided with the two crank-arms *i* and *j*, secured to the two shafts *f* and *g*.

Each crank-arm has a slot, *h*, formed near its end at different distances from the centers of the shafts, and a connecting-rod, L, having a branch, *l*, formed upon its end, operates both arms at once by means of pins *k*, secured in the branch and fitting into the slots. One arm is thus traversed through a much greater angle than the other by the same connecting-rod, and the tip-section *e* rubbed upon the hat as effectively as the body-section *d*.

The carriage I is shown as a box containing a gas heater or stove, *m*, and having the cone, or, rather, its casing *a*, resting upon its top about the margin of an opening above the stove.

The box has ribs *n* fitted to the ways *o*, and thus slides freely upward when pressed by a treadle, M.

The gas-stove is supplied with gas by a flexible pipe, *p*, and serves to maintain any degree of dry heat beneath the hat when desired.

The hat and bat, being inside the cone, are subjected to the action of the vibrating rubber by the elevation of the carriage at pleasure, and movement in any desired degree is imparted to the connection L by a crank and shaft, N, arranged upon the top of the frame H.

A series of such machines can be operated by one such connecting-rod by arranging the cones C and G, with their fixtures, in a line upon a suitable frame or frames.

Another form of rubber which may be operated either by hand or mechanically is shown in Fig. 2; and it consists in a conical body more acute than the forming-cone, and consequently bearing only upon the tip when inserted therein. By rolling such rubber continuously around in contact with the hollow sides of the body placed in the cone C, the tip and body of the hat are equally agitated or rubbed gently against the bat, as desired.

By the use of the mechanism described, or any other operating similarly, the bat can be stuck effectually in less than a minute, and a quantity of such hats can be stored indefinitely with the dry naps stuck thereon, while hats stuck by the wet processes usually employed require immediate scalding or similar treatment to prevent mold and decay arising from dampness.

The forming of the bat within a hollow cone secures many important advantages both in the preparation of the bat itself and in the subsequent sticking and handling. Thus in forming bats upon the outside of a cone great difficulty is experienced in laying the fur and cotton on evenly, as the latter consists of only one-eighth of an ounce in a bat, and is often deposited upon one side of the cone, owing to the slow rotations of the latter, which are not completed before the fibers have all fallen.

By presenting the open mouth of the cone to the fibers ample room is afforded the fibers to reach every side at once, and the bat is therefore deposited as well in a stationary as a revolving cone, if the fur is discharged centrally. The tendency of the fur is also to settle into the tip of the cone, thus forming a bat thick at that point, which is a very desirable object, and one hard to secure in the use of the convex cone, as heretofore employed.

The tip of the cone in our mode of operation is nearest to the suction-chamber and devices, which is just the opposite in the case of the convex cone, and accounts still further for the tendency of the fur to the tip of the bat, as desired.

When removed from the forming-machine inside a cone, the bat is thoroughly protected from accident, and may be carried anywhere, while the bats formed upon the exterior of the cone are easily destroyed by a slight draft of air, and are still more liable to injury when the hat-body is applied over them. This results from the hat-body obscuring the nap-bat, and thus concealing it from the operator, who is thus constantly liable to touch the sides or tip of the nap with the body and tear it apart.

The pressure of sticking the hat and nap together upon a convex cone also tends to rupture the tip of the bat, while the form and position of the bat in a hollow cone secures just the opposite results.

The hat-body can be folded, if desired, and inserted in the bat in full view, and tends, if pressed against the bat at any point, merely to consolidate it, as the movement is all toward the tip.

In sticking a bat to a hat upon a convex cone the bat naturally contracts in size as it hardens, and shrinks away from the body in consequence. The adhesion between the bat and hat are therefore imperfect, and the fibers in their contraction cling to the forming-cone, and are only removed with difficulty by artificial means, as air or steam pressure.

By our methods the tip of the bat is preserved from strain, and the shrinkage in hardening, during the sticking process, draws the bat away from the hollow cone and into closer contact with the hat-body inside the bat. It results that the bat is closely united to the body, and is entirely loose from the forming-cone, so as to fall out after sticking, if turned over.

The bat may also be removed from the cone before sticking by inserting the hat-body therein and pressing it upon the bat until the

latter adheres to the hat-body, when both may be removed from the cone, and the sticking process completed by any suitable means.

Many of the mechanical operations described herein may be performed by equivalent mechanism, and we do not therefore limit ourselves to the precise construction shown. Thus the hollow cone may be provided with vibrating or rotating mechanism, and the rubbing-cone G or other pressing or agitating device be held fixed inside it; or other arrangements equivalent to those described may be used.

The dry heat supplied by a gas-stove may be furnished by a hot iron or coil of closed steam-pipe; or the hat-body or cone and bat may be warmed independently and placed together while hot.

If preferred, steam vapor may be used instead of the dry heat, and may be applied in any desired manner to the casing *a*, the cone G, or the bat inside of it.

The bats formed by the above-described process require to be made considerably larger than the hat-bodies to be stuck on them, for the reason that the sticking process as performed herein tends to harden and shrink the nap-bats, and while causing thereby a very firm adherence between the bat and the body necessitates the allowance in size mentioned above, which may be from half-inch to three-quarters on a side.

In the sectional view of the rubbing-cone shown in Fig. 5 a covering of a yielding character is indicated at *y*. Such covering may be made of felt, india-rubber, or other suitable material; or the whole cone may be formed of yielding substances to make it fit the body perfectly.

The cone C is shown herein as provided with a casing, *a*, which serves as a pedestal to support it when removed from the turn-table D. The casing may, however, be provided as a fixture to the turn-table and the sticking-machine, respectively, by securing it to the table and the box or carriage I. The cone in such case would appear like the convex forming-cones heretofore used, and the fur would be deposited upon its inner or the contrary side to that formerly employed.

As fur has been deposited in the interior of a cone for making a hat-body, we do not claim the process of thus forming in a hollow cone, broadly, but restrict the same to the formation of napping-bats, substantially as herein described, the hollow cone performing many functions in the forming, hardening, and sticking of a nap-bat which it cannot perform in the case of a hat-body, because the latter is never stuck to a previously-felted fabric while in the cone or subjected to any of the operations described herein as performed upon a nap-bat before its removal from the cone.

A nap-bat, being also of a different texture from a hat-body by reason of the fineness and lightness of its material, requires a greater degree of protection and a totally different kind of handling from a hat-body; and the hollow cone, in affording such protection and means for handling and operating upon a napping-bat, performs new functions not known or used in the forming of a hat-body in a similar cone.

A forming-machine adapted for depositing the fur most rapidly would be made to operate alternately upon two hollow cones, the latter being arranged upon a revolving or sliding table to bring them alternately beneath the mouth of the trunk B, or the latter arranged to swing over first one and then the other cone, arranged in proximity to the forming-machine at a distance adjusted to the mouth of the trunk. Such devices are not shown or claimed herein, as they are made the subject of a separate application; but the devices shown for forming the bat are claimed, with the rubber shown, in the following manner.

We claim—

1. The herein-described process of forming napped hats, consisting of forming the napping-bat within a hollow cone, and in sticking the hat-body to the napping-bat while in the cone.

2. The method herein described for sticking a hat-body to a nap-bat, consisting, first, in forming the nap-bat in the inside of a hollow perforated cone; second, in placing the hat-body in contact with the nap-bat inside the cone, and, third, in subjecting the hat-body and bat to a vibrating, rubbing, or rolling action before removal from the cone, as and for the purpose set forth.

3. In sticking the hat-body to a nap-bat formed inside a hollow cone before removal from the cone, and subjecting the tip to a subsequent hardening or sticking treatment by suitable mechanism, substantially as and for the purpose set forth.

4. The combination, in a conical rubber operating inside a hollow cone, as and for the purpose set forth, of two or more sectional parts vibrated or otherwise operated at different strokes or velocities, substantially as herein described.

5. The mechanism for operating the sectional parts of a conical rubber, consisting in the concentric shafts provided with crank-arms of different radii, the arms being operated by the same vibrating connecting-rod, substantially as shown and described.

6. In combination with a hollow forming-cone operated as described, a rubbing-cone having a yielding surface adapted to conform to the hat-body inside the forming-cone, and vibrated or rotated within the hat-body while in the cone, substantially as and for the purpose described.

In testimony whereof we have hereunto set our hands in the presence of two subscribing witnesses.

GEORGE YULE.
GILES ATHERTON.

Witnesses:
THOS. S. CRANE,
HENRY F. GÖKEN.