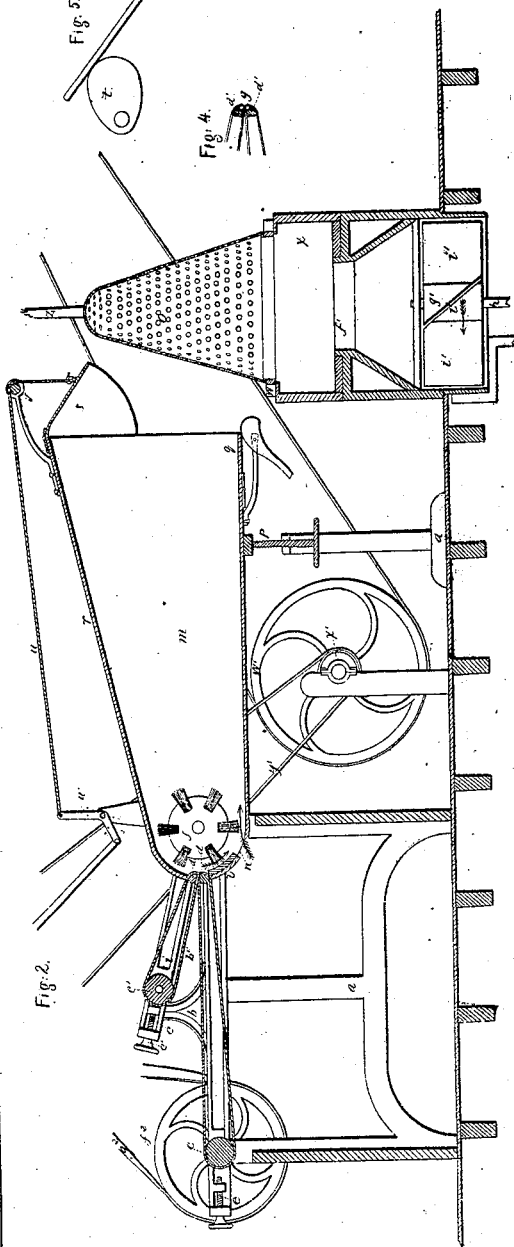
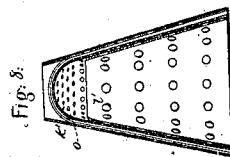
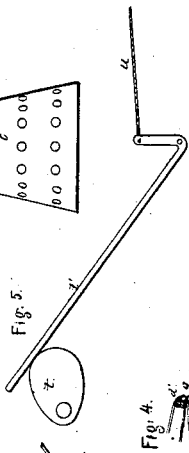
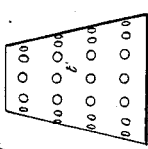
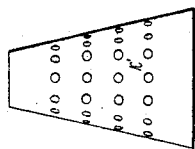
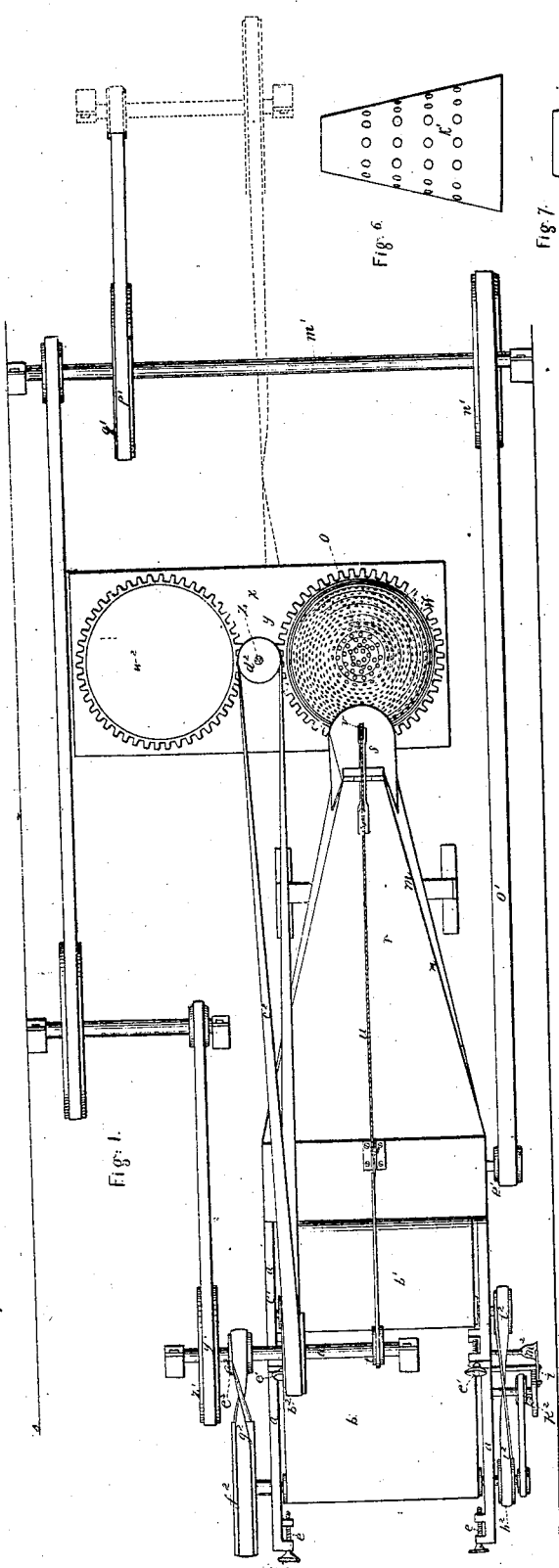


H.A Wells.
Forming Bats.

Sheet 1. 2 Sheets.

N^o 4472.

Patented Apr. 25/1846.



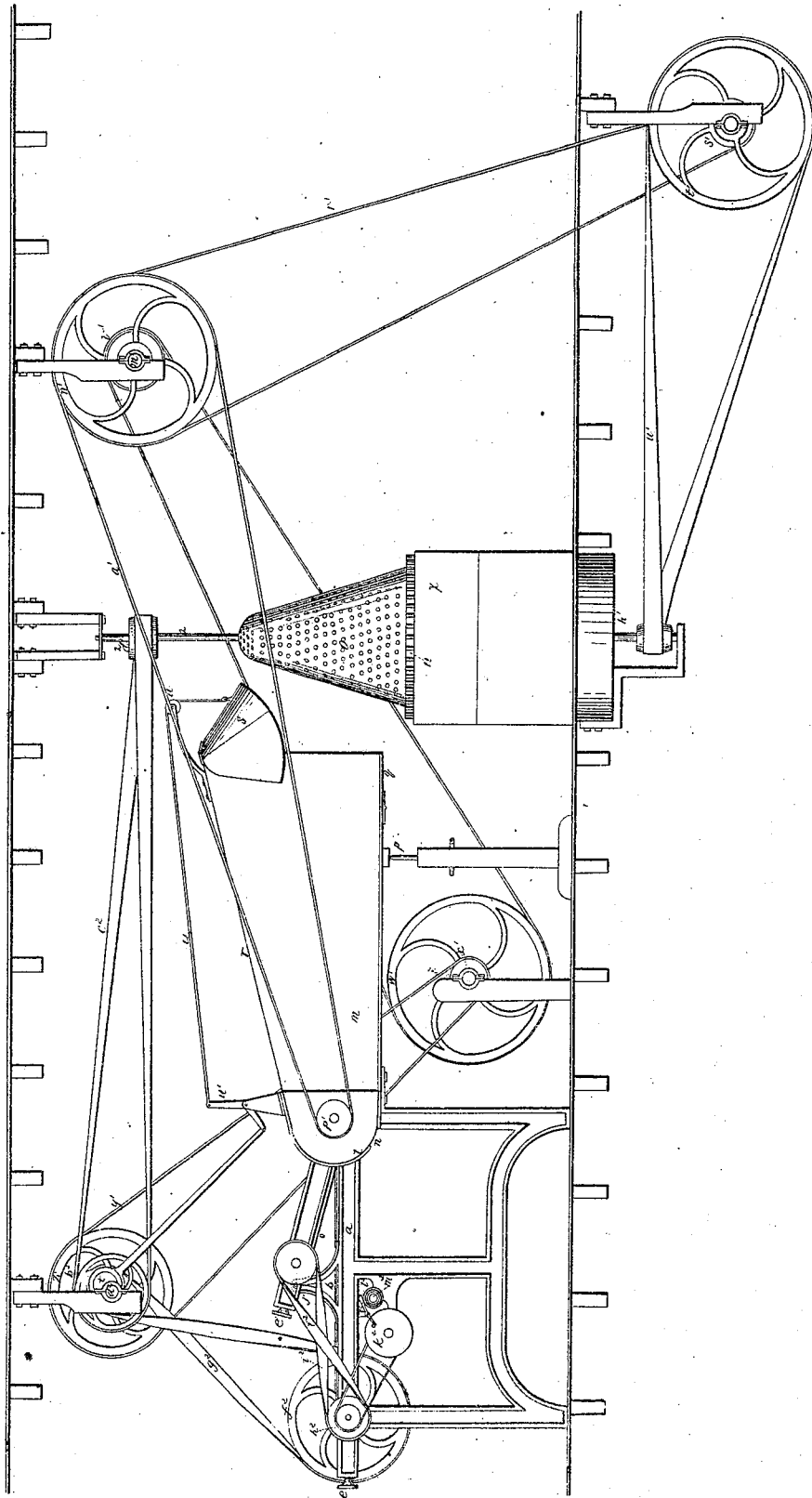
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Forming Bats.

Sheet 2. 2 Sheets.

N^o 4472.

Patented Apr. 25 1846.

Fig. 3.



UNITED STATES PATENT OFFICE.

HENRY A. WELLS, OF NEW YORK, N. Y.

MACHINERY FOR MAKING HAT-BODIES.

Specification forming part of Letters Patent No. 4,472, dated April 25, 1846; Reissued September 30, 1856, No. 396.

To all whom it may concern:

Be it known that I, HENRY A. WELLS, of the city, county, and State of New York, have invented new and useful Improvements in the Process of and Machinery for Making Hat-Bodies, &c., and that the following is a full, clear, and exact description of the principle or character thereof which distinguishes them from all other things before known and of the manner of making, constructing, and using the same, reference being had to the accompanying drawings, making part of this description, in which—

Figure 1 is a plan of the machine; Fig. 2, a longitudinal vertical section, and Fig. 3, a longitudinal elevation. The other figures will be described in their appropriate places.

The same letters indicate like parts in all the figures.

It has long been essayed to make hat bodies, by throwing the fibers of fur, wool, &c., by a brush or picker cylinder, onto a perforated cone, exhausted by a fan below, to carry and hold the fibers thereon by the currents of air that rush from all directions toward and through the apertures of the cone, and thus form a bat of fibers, ready for hardening and felting; but from various causes all these attempts have failed. I have however so improved this machine in various important particulars as to remove all the objections, as proved by the test of experiment.

My improvements consist in feeding the fur, (called the stock), after it has been picked, to a rotating brush between two endless belts of cloth, one above the other, the lower one horizontal and the upper inclined, to gradually compress the fur, and grip it more effectually where it is presented to the action of the rotating brush, which, moving at a great velocity, throws it in a chamber or tunnel which is gradually changed in form toward the outlet where it assumes a shape nearly corresponding to a vertical section passing through the axis of the cone, but narrower, for the purpose of concentrating and directing the fur thrown by the brush onto the cone; this casing being provided with an aperture immediately under the brush through which a current of air enters, in consequence of the rotation of the

brush and the exhaustion of the cone, for the purpose of more effectually directing the fibers toward the cone, which is placed just in front of the delivery aperture of the chamber or tunnel, which aperture is provided at top with a bonnet or hood hinged thereto and at the bottom with a hinged flap to regulate the deposit of the fibers on the cone or other former with the view to distribute the thickness of the bat wherever more is required to give additional strength. As the fibers are only held to and on the cone by the pressure of the surrounding air in consequence of the exhaustion of the cone or former, preparatory to the suspension of this pressure some means must be adopted of holding and retaining the fibers composing the bat, and it is obvious that this delicate web, thus formed, has not sufficient tenacity to admit of removing it from the cone or former before the hardening process; and therefore my invention also consists in covering the bat, before it is removed from the cone or former, with felted or fulled cloth, and then employing one or two perforated metallic cones, one to put over the bat after it has been surrounded with the moist felt or cloth, for the purpose of making pressure on the fibers and to admit of the circulation of hot water when the whole is immersed therein to harden the bat preparatory to felting, and the other to be placed within the perforated metallic cone on which the hat has been formed and which is necessarily thin and weak, for the purpose of resisting the pressure of the surrounding water consequent upon a partial vacuum produced within when the whole is withdrawn from the water.

In the accompanying drawing (a) is a frame properly adapted to the operative parts of the machine, and (b) the lower feed apron on which the stock is spread by the attendant, in separate parcels, each sufficient for the formation of a hat according to its intended weight. This apron or endless belt of cloth, or other suitable material, passes around a roller (c) and a lip (d), the former at the back of the machine with its bearings in sliding boxes governed by set screws (e, e), for the purpose of tightening the apron, and the latter near to the rotating

brush (*f*), and so formed as to present a slightly rounded edge for the apron to pass over where it presents the fur to the action of the brush. Instead of this slightly rounded edge, a small metallic roller may be substituted, but when this is done the roller should be supported at different points between its end journals; and this I have effected by letting it run in a circular groove in the lip, as represented in section at Fig. 4, where (*g*) indicates this roller. The fur as it is carried along toward the lip (*d*) is gradually pressed onto the fur between it and the under lip (*d*) and thus grip the fibers and present them to the effective action of the brush (*f*). The under plane of the upper apron (*b'*) is inclined to the upper plane of the lower one (*b*) the more effectually to present the fibers in a proper manner to the brush. The roller (*c'*) of the upper apron runs in sliding boxes governed by set screws (*e', e'*), and is placed forward of the journals of the frame, so that the tension of the belt (*i²*) which communicates motion from the lower roller (*c*) to the upper one (*c'*) may press the upper lip (*d'*) on the under lip (*d*); but this may be effected by means of springs, weights, or other well known mechanical devices for making pressure under similar circumstances.

The fibers as they pass from the feed aprons are acted upon by a brush (*f*) that rotates with great velocity, and which is composed of parallel rows of stiff bristles projecting from a cylinder, but which may be differently constructed and composed, if desired. As the fibers are first presented they are brushed and properly laid by the downward action of the brush, as indicated by the arrow, and when liberated are carried down the curved surface (*l*) of a chamber or tunnel (*m*), and at the lower edge of this they meet a current of air (that enters a narrow aperture (*n*) near the bottom of the chamber and extending the whole length of the brush,) which being induced by the rotation of the brush and the partial vacuum in the perforated cone, prevents the fibers of fur from falling and resting on the bottom of the chamber, and carries them onto the perforated cone (*o*). This chamber extends over and under the brush and the forward part of the lips, turns on the journals of the brush, or is otherwise so arranged as to have a slight motion, the axis of which is the same as that of the brush—its bottom rests on a set screw (*p*) to regulate the delivery end of the chamber relatively to the cone—its forward end in addition to this is provided with a hinged flap (*q*) regulated by a cam lever as a means of regulating the delivery of the fibers—its top (*r*) is gradually elevated, and sides contracted to make the delivery aperture nearly of the form of

the cone, but narrower and higher, and its upper part is provided with a hood (*s*) so curved as to correspond generally with the curve of the top of the cone. This hood is hinged to the upper part of the delivery aperture of the chamber, and is connected with an eccentric (*t*) by means of a cord (*u*) and bell crank (*u'*) that passes over a pulley (*v*) so that each revolution of this eccentric carries the hood up and down to direct the discharge and distribute the fibers onto the cone, a greater thickness being desirable in the parts of the bat which form the brim and edge or square of the top, than on the top and crown, and when it is desired still farther to diversify the distribution of the fibers, a cam can be substituted for the eccentric, and the connection between it and the hood is formed (as represented in section at figure 5) where the cam *t* acts on a lever (*t'*) connected with the hood (*s*) by the cord (*u*).

The cone (*o*) is made in the usual manner, but of thin sheet metal perforated, instead of wire gauze; its lower edge fits in a metallic ring (*w*), that runs in an appropriate collar in the upper part of a case (*x*), and its outer periphery is provided with cogs that mesh into the cogs of a pinion (*y*) concealed in the drawing by the pulley (*d²*) on a vertical shaft (*z*), by which a slow rotary motion is given to the cone, as the fibers are thrown onto it to distribute them equally all around the cone. The case (*x*) is sufficiently long to receive two rings (*w*), one on each side of the pinion (*y*) by which both are kept in motion, and it (the case) is made to swivel on a hollow collar (*f'*) to which its bottom is fitted so that when one cone is covered it may be turned aside by turning the case half a revolution, and another cone put onto the other ring, that another bat may be in the process of forming while the one already formed may be prepared for the hardening process in the manner to be hereinafter described. The case (*x*) communicates through the hollow collar (*f'*) with an exhausting fan blower (*g'*) which consists of a vertical arbor (*h'*) with oblique vanes (*i'*), so that when rotating with great velocity, in the direction of the arrow, the air is exhausted from the case (*x*) and the perforated cone (*o*). When one of the cones is removed from one of the rings (*w*), to be taken to the hardening apparatus, the aperture in the ring (*w*) must be closed up with a cap plate (*w²*) to prevent the access of air. Any other mode of exhausting the case and cone may be employed, but this is the most efficient which I have essayed. The preparation of the formed bat for hardening is effected by covering it with pieces of felt or fulled cloth just taken from hot water, which is done in the following

manner viz: The attendant takes from a kettle of hot water a piece of felt cloth rolled up on a roller, and applies one end of it to the surface of the bat, and as the cone rotates the felt cloth winds from the roller on to the bat on the cone, another piece of felt cloth is put on the top, and then a strong perforated metallic cone (h') (see Fig. 6) is put over the whole the more effectually to hold the fibers of the bat and to make a slight pressure on them while it is immersed in hot water to harden. As the perforated cone (o) is better when made very thin, the pressure of the water, when drawing it out of the kettle, after the bat has been hardened, tends to, and would collapse it, and therefore to prevent this I employ another perforated metallic cone (l') (see Fig. 7) which is put inside (before the whole is immersed in hot water) to sustain the pressure in drawing the whole out of the hardening kettle. The relative situation of the three cones, the bat and the covering felt cloth, preparatory to the hardening process is represented on an enlarged scale at Fig. 8, which is a vertical section through the whole. The inner sustaining cone may be dispensed with, if desired by making the cone (o) of greater thickness and strength.

All the operative parts may be set in motion by any of the known means, such as belts, as fully represented in the accompanying drawings, in which (m') is a main line shaft, over head, driven by any first mover; from a wheel (n') on it a band (o') extends to a pulley (p') on the shaft of the brush which should make about two thousand revolutions per minute, more or less. From another wheel (q') on this same shaft, a band (r') extends to a pulley (s') on the shaft of which there is a wheel (t') that drives the exhaust fan (g') by the belt (u'). And from a pulley (v') on the same line shaft a belt extends to a wheel (w'), on the shaft of which there is a pulley (x') from which extends another belt (y') to a wheel (z') on the shaft (a^2) (that carries the eccentric (t)) to give all the reduced motions required for the other parts of the machinery. From a wheel (b^2) on this shaft a belt (c^2) extends to a pulley (d^2) on the shaft (z) that rotates the cone (o). And another pulley (e^2) drives the wheel (f^2) of the feed roller (c) by the belt (g^2), and on the other end of the axle of this feed roller there is a pulley (h^2) which drives by a cross belt (i^2), the upper feed roller (c'). If desired an alarm can be connected with the feed roller of the lower apron to announce to the attendant when each charge of stock is exhausted, that the cones may be shifted. This can be done by connecting the arbor of the feed roller (c) of the lower feed apron, by a belt with a

wheel (h^2) provided with a cam or pin to lift at every revolution, the hammer (l^2) of a bell (m^2) the striking of which shall give requisite indication.

It will be obvious from the foregoing that the hood may be operated by hand instead of by machinery, thus substituting the attention, skill and cost of an operative, for the positive regularity and cheapness of mechanical movements; but such a change, while it gives less perfect and advantageous results, still involves one of the essential parts of my invention. It may be well to add, as a mere matter of precaution, that this invention is not limited to the making of hat bodies, but to the making of hats on formers of any other shape or configuration, the form of the delivery aperture of the chamber, and the hood, and the movements of the latter being properly adapted to the change of form of the mold or former, with the restrictions indicated.

What I claim as my invention and desire to secure by Letters Patent in the machinery above described, is—

1. The arrangement of the two feeding belts, with their planes inclined to each other, and passing around the lips formed substantially as described, the better to present the fibers to the action of the rotating brush as described, in combination with the rotating brush and tunnel or chamber which conducts the fibers to the perforated cone or other former placed in front of the aperture or mouth thereof, substantially as herein described.

2. I claim the chamber into which the fibers are thrown by the brush, in combination with the perforated cone or other former placed in front of the delivery aperture thereof, for the purpose and in the manner substantially as herein described, the said chamber being provided with an aperture below, and back of the brush for the admission of a current of air to aid in throwing and directing the fibers onto the cone or other former, as described.

3. I also claim the employment of the hinged hood to regulate the distribution of the fibers on the perforated cone or other former, as described.

4. And I also claim providing the lower part or delivery aperture of the tunnel or chamber with a hinged flat for the purpose of regulating the delivery of the fibers to increase the thickness of the bat where more strength is required as herein described, in combination with the hood as herein described.

5. And in the process I claim hardening the bat while on the perforated cone or former, and preparatory to its removal therefrom, by immersing it in hot water, as herein described, I also claim covering

the bat with felted or fulled cloth before it is removed from the cone or former as described.

6. And finally, I claim the employment
5 in combination of both of the perforated cones, one for making pressure on and retaining the fibers of the bat until hardened,

and the other to prevent the collapse of the cone or other former on which the bat is formed, substantially, as herein described.

H. A. WELLS.

Witnesses:

CHAS. M. KELLER,
A. V. BROWNE.

[FIRST PRINTED 1913.]