

(No Model.)

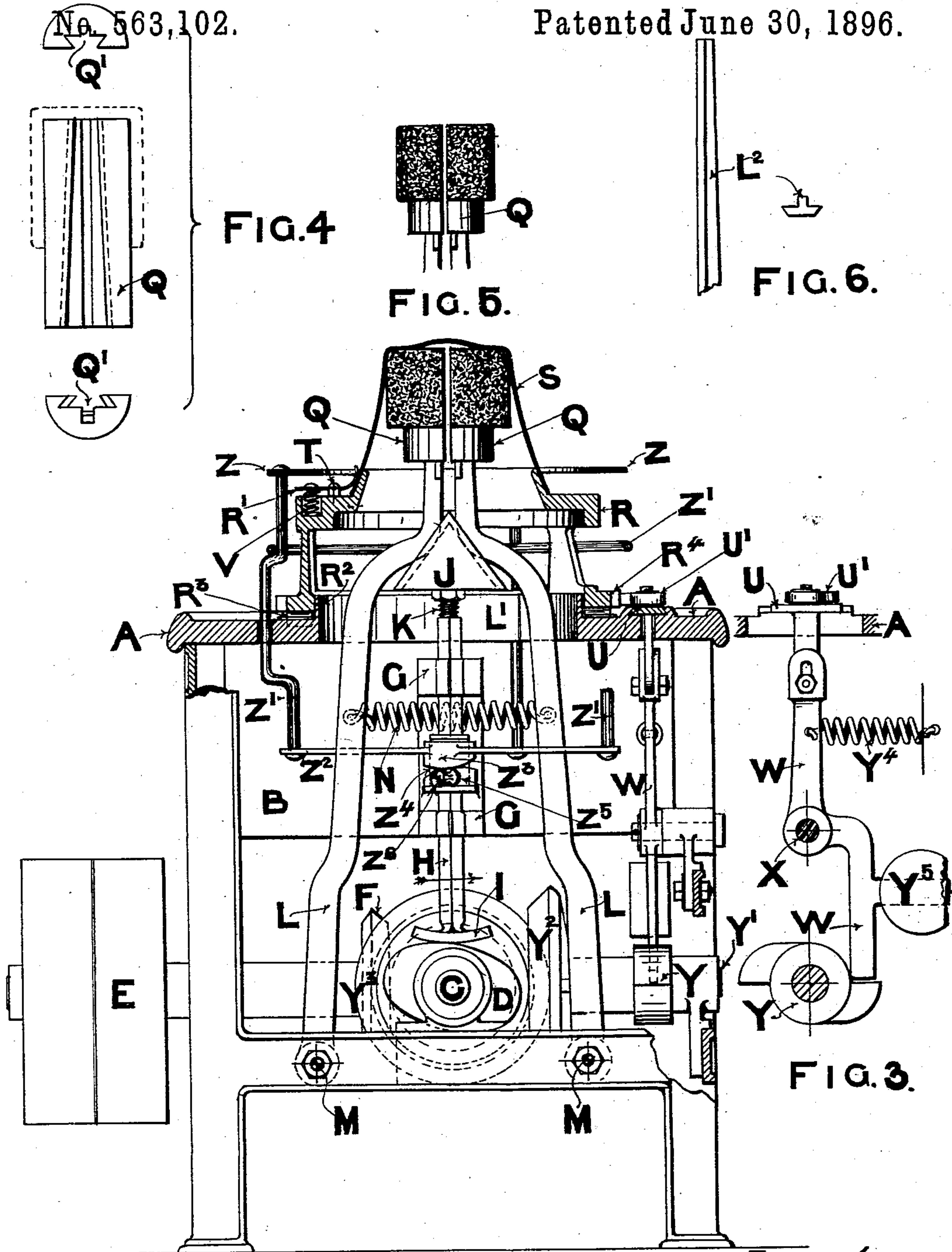
2 Sheets—Sheet 1.

HENRY H. TURNER, ALBERT TURNER &  
ARNOLD TURNER.

## HAT BODY STRETCHING MACHINE.

No. 563,102.

Patented June 30, 1896.



*Witnesses.*

Thos. A. Green

Robert Emmett.

**FIG. 1.**

Inventors.

*Henry H. Turner,*

Albert Turner  
Arnold Turner

Arthur Turner.  
By 1 1 1

By James L. Norring

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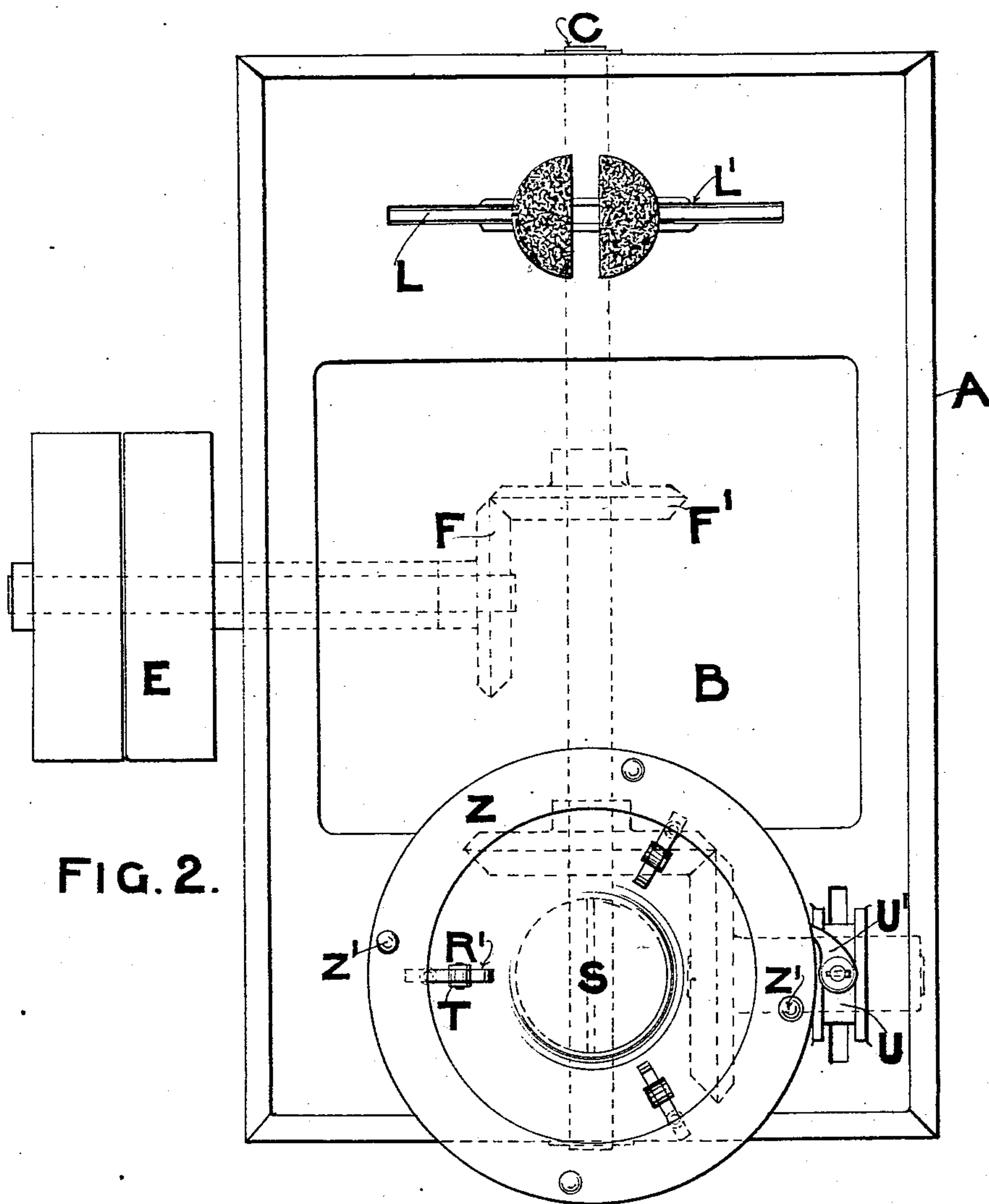


FIG. 2.

Witnesses.

Thos. A. Green

Robert Emmett

Inventors.  
Henry H. Turner.  
Albert Turner.  
Arnold Turner.

By James L. Norris,  
Atty.



# UNITED STATES PATENT OFFICE.

HENRY HERBERT TURNER, ALBERT TURNER, AND ARNOLD TURNER, OF  
DENTON, ENGLAND.

## HAT-BODY-STRETCHING MACHINE.

SPECIFICATION forming part of Letters Patent No. 563,102, dated June 30, 1896.

Application filed May 3, 1895. Serial No. 548,060. (No model) Patented in England March 23, 1895, No. 6,058.

*To all whom it may concern:*

Be it known that we, HENRY HERBERT TURNER, ALBERT TURNER, and ARNOLD TURNER, subjects of the Queen of Great Britain and Ireland, and residents of Denton, England, have invented a new or Improved Felt-Hat-Body-Stretching Machine, (for which we have obtained Letters Patent in Great Britain, No. 6,058, dated March 23, 1895,) of which the following is a specification.

Our invention consists of a new or improved machine for stretching felt hat-bodies in the process of their manufacture whereby such hat-bodies are stretched with greater evenness or accuracy and with greater rapidity than is possible by hand-stretching.

In accordance with our invention we employ a suitable frame or table, fitted with a hot-water tank and upon suitable bearings. On such frame we mount a set of levers, carrying at their upper extremities semicircular blocks, which, according to our invention, are covered with a coating of india-rubber or similar soft yielding material with a, by preference, roughened or spongy-like surface. These levers are drawn together by a spiral spring or rubber band, and always tend to bring the two half-blocks aforesaid into contact with each other, and so make up a complete circular block. At a point near their upper extremities the aforesaid levers are bent and their innermost or opposite edges engage with an inverted-V-shaped block at the upper extremity of a vertical rod or shaft, which rises and falls with the movement of a cam or eccentric on the driving-shaft of the machine. The upward movement of said V-shaped block separates the levers aforesaid and with them the semicircular blocks, which, carrying the hat-body to be stretched, effectually distend or stretch it to an extent equal to the distance they separate from each other. With the alternate opening and closing of the block the hat-body is turned around a fraction of a revolution, so as to put an equal amount of stretch in all portions of the hat-body. This operation may be done by hand, or may be done automatically, as hereinafter described.

In order that our said invention shall be the more readily understood and carried into practical effect, we have hereunto annexed

drawings, and will now proceed to describe the same with the assistance of the various letters of reference marked thereon.

Figure 1 is an end elevation, and Fig. 2 a plan, of our improved machine, the former partly in section and the latter with certain parts omitted to show our invention more clearly and to show our improved machine with or without the mechanism for rotating the hat-body. Fig. 3 is a side view of Fig. 1, and Figs. 4, 5, and 6 illustrate details of the stretching-blocks and the means of attaching them to their levers.

In accordance with our invention, which we will first describe as applied for stretching hat-bodies without the mechanism for turning the hat-bodies around, A is the table or frame of our improved machine, embodying a hot-water tank B.

C is a shaft which extends from side to side of the machine and receives motion from the driving-pulley E through the bevel-wheels F F'. On this shaft is mounted an elliptical or egg shaped cam D, keyed to and capable of revolving therewith.

Upon the side of the tank B are mounted the brackets G, in which is mounted and capable of working up and down therein the square rod H. At the lower extremity of this rod H is a curved or "anchor-shaped" foot I, which is in a line with and always rests upon the periphery of the cam D, and at the upper extremity of the said rod is a triangular or wedge shaped block J, (hereinafter called the "separating-block,") which is connected to the said rod by the screw K, which adjusts the block in relation to the rod and adjusts it in relation to two arms or levers L, which are constantly drawn together and in contact with the recessed or flanged edges of said separating-block by a spring N. The said levers L are mounted on centers M and pass through opening L' in the table-top. On the upper extremity of each of the said levers L is a semicircular metal block Q, upon the curved face of which is a coating or sleeve of india-rubber, by preference molded direct onto the cap and left with a roughened or spongy exterior surface. These blocks when put together, with their flat faces opposite each other, form a complete circular



block, and it is upon this block that the hat-body to be stretched is placed.

The action of our improved machine, so far as hereinbefore described, is as follows: Revolving motion is imparted to the shaft C from the pulley E. The cam D being in a horizontal position when the blocks are nearest together and the rod H and block J in their lowest position, the effect of the cam's action in revolving is to raise the rod H, and with it the separating-block J, which, pushing its "nose" between the two levers L, causes the two levers and blocks to separate to an extent equal to the diverging angles of the block sides and the elevation of the rod H by the cam D, but as the cam comes to a horizontal position again, and the rod H and block J descend, the levers L once more approach each other and bring the half portions of the stretching-block together. When the blocks Q are nearest together, the felt hat-body to be stretched is placed upon them, and as the block opens and closes or the blocks Q advance and recede to and from each other the felt hat-body is given a slight turn, so as to secure the most effectual and equal stretching of all the parts thereof. To effect this movement automatically and to insure of the hat-body being turned around equal distances for every stretch of the blocks, we employ the arrangement shown more clearly in Figs. 1 and 3 and at the left-hand end of Fig. 2, which consists of a hollow circular stand R, the upper part of which is of conical formation and extends into the hat-body S. At equal distances apart and mounted in small brackets T on the said stand R is a series of spring blades or clamps R', with roughened or rubber gripping-faces which, as the edge of the hat-body S is placed upon the stand, clip or bind such edge against the stand under the upward pressure of spiral springs V. The said stand R is kept central by the flange R<sup>2</sup> of the machine-top, and to enable it to move freely is mounted upon antifriction-rollers R<sup>3</sup>. (See Fig. 1.) Upon the lower and outer periphery of this stand R is a set of ratchet-teeth R<sup>4</sup>, and more or less tangent to one side of the stand is a slide U, carrying a ratchet tooth or pawl U', held in gear with the ratchet-teeth R<sup>4</sup> by a spring. The slide U is mounted in a dovetail groove and is capable of moving to and fro for impelling the pawl U' against the teeth R<sup>4</sup>, and of so imparting to the stand a fraction of a turn for each forward stroke. The slide U is linked to a lever W, centered at X. This lever at its lower and free extremity engages with a double cam Y, mounted on the shaft Y', driven by the bevel-wheels Y<sup>2</sup> Y<sup>3</sup> from the driving-wheel E at the same rate and speed as the cam D. When the cam D comes to its horizontal position, the free end of the lever W has been forced out of the vertical to an extent equal to the length of one "claw" or tooth of the cam Y, and just at the instant when the blocks Q are nearest together, and

the hat-body fits slackly thereon, such lever end slips off the claw and under the pull of a strong spiral spring Y<sup>4</sup> and weight Y<sup>5</sup> regains its normal position, and in so doing causes the slide U and pawl U' to move forward and turn the stand R and hat-body S a fraction of a revolution, ready for the next stretch. The blocks Q opening twice for one revolution of the cam D, it will be obvious that the other claw of the cam Y operates for the next turning of the stand and hat-body.

The amount of traverse imparted to the stand may be varied by altering the fulcrum of the lever W or the size of the cam Y.

To lock the stand during the operation of stretching, a click or pawl, set in an opposite direction to the pawl U', may be arranged on the opposite side of the stand.

As soon as the hat has been turned a complete revolution and it is desired to remove the stretched hat-body to make way for the next hat-body it is necessary to release the edge thereof from the clamps R', and to this end we employ a hoop Z of such a diameter as to overhang the free ends of the clamps R', as illustrated, and to such hoop is connected a series of rods Z', two of which pass through openings in the machine-top, as illustrated, and are connected to cross-bars Z<sup>2</sup>, which in turn are connected to a boss Z<sup>3</sup>, mounted centrally upon a sleeve Z<sup>4</sup> on the rod H. This sleeve Z<sup>4</sup> forms part of a bracket on the tank side and carries a "switch-block" Z<sup>5</sup>, with handle Z<sup>6</sup>, resting on the flange of the sleeve Z<sup>4</sup>.

The under face of the boss Z<sup>3</sup>, to which the cross-bars Z<sup>2</sup> are connected, has an inclined face corresponding to that on the switch-block Z<sup>5</sup>. It will now be obvious that on turning the switch-block Z<sup>5</sup> to the right, or in the direction of the arrow, the cross-bars Z<sup>2</sup>, rods Z', and hoop Z will all be lowered, and this latter pressing on the free ends of the spring-clamps R', which it overhangs, as aforesaid, causes such springs to tilt up and to release their hold on the hat-body. Until the switch-block Z<sup>5</sup> is reversed the hoop Z holds the spring-clamps clear of the hat-body and thus enables the hat-body to be changed, and the edges to be released and nipped without any effort on the part of the operator.

The position of the switch-block Z<sup>5</sup> and the length of its handle Z<sup>6</sup> permits of the same being actuated by the knees, and thus leaves the operator's hands free to manipulate the hat-bodies.

If desired, the movement of the stand may be continuous, with a frictional or other similar device to impart motion to the hat-body at the proper time.

The peculiar rough surface of the india-rubber on the half portions of the stretching-block is very effective in the action of stretching the felt hat-bodies, as it affords a firm grip on the surface of the felt, and is sufficiently yielding to prevent the felt being damaged or unduly stretched.

To effect the stretching of the felt hat-



bodies gradually, or by degrees, from the tip to the wider portions, or to stretch hats of different sizes, we provide our machine with interchangeable and different-sized blocks, and we duplicate the machine, as illustrated more clearly in Fig. 2, providing, say, the levers on the right-hand side of the machine with blocks suitable for stretching the tip of the hat, or small size of hat-body, and the levers on the left-hand side of the machine with blocks suitable for stretching the crown, or wider portions of the hat, or larger sizes of hats.

When it is preferred to use our improved machine without the automatic mechanism for turning the hat-body, the table-top will be formed as seen at the right-hand end of Fig. 2.

The mechanism for operating the blocks at one end of the machine is the same at the other end for operating the other blocks, the driving-shaft C operating both. The blocks are, by preference, timed to open and close alternately, that is to say, when the two half portions of one block are farthest apart, the two half portions of the other block are nearest together, thus enabling a single operator to attend to both blocks, or for two operators to work uniformly.

In lieu of the spring N an endless rubber band may be passed around the levers L to draw them together, preferably at a point above the table-top. The fixing of the blocks Q is effected by a tapered dovetail groove Q', fitting onto tapered dovetail ribs L<sup>2</sup> on the levers L. To effectually mold the india-rubber on the metal blocks Q, the curved surfaces of such blocks are, by preference, serrated or grooved circumferentially, with the grooves slightly undercut on the side farthest from the machine.

Having thus particularly described and ascertained the nature of our said invention and in what manner the same is to be performed, we declare that what we claim is—

1. In a machine for stretching felt hat-bodies, the combination with a machine-table of a rotatable stand mounted on said table and provided with ratchet-teeth, a slide upon the table having a tooth to engage the ratchet-teeth, a weighted lever connected to the slide, and a cam and cam-shaft to operate the weighted lever in one direction, the rotatable stand being provided with fastenings for the edge of the hat-body and having an opening for levers which carry stretching half-blocks, substantially as described.

2. In a machine for stretching hat-bodies the combination with a frame having a slotted table, of a pair of levers pivoted at their lower ends to the frame, and projecting through said slotted table stretching-blocks secured to the upper ends of said levers, a vertically-reciprocating rod arranged between said levers, a wedge-shaped spreader adjustably secured to the upper end of said rod and adapted to engage and spread said levers and the stretching-blocks on the upward reciprocation of the rod, a cam for forcing said rod upward, means for driving said cam, and a spring for returning said levers and stretching-blocks to normal position, substantially as described.

3. In a machine for stretching hat-bodies the combination with a table and stretching mechanism, of a rotatable stand mounted on said table and provided with ratchet-teeth, a slide upon the table having a tooth to engage the ratchet-teeth, a weighted lever connected to the slide, and a cam and cam-shaft to operate the weighted lever in one direction, the rotatable stand being provided with a fastening for the edge of the hat-body, substantially as described.

4. In a machine for stretching felt hat-bodies, the combination with a circular, rotatable stand mounted on the machine-table and having a rising flange adapted to lie inside the edge of the hat, of spring-pressed clamps mounted on the stand and adapted to clamp the edge of the hat against its flange, a hoop supported by rods passing through the machine-table and overhanging the outer ends of the spring-pressed clamps, a vertically-movable flanged sleeve having a central boss connected to cross-bars of the rods supporting the hoop, and a switch-block carried by the sleeve and having a handle resting on the flange of the latter, the switch-block and the under face of the boss having opposite inclinations, substantially as described.

HENRY HERBERT TURNER.  
ALBERT TURNER.  
ARNOLD TURNER.

Witnesses to the signature of Henry Herbert Turner:

CHAS. LORD,  
LEIGH WHITTAKER.

Witnesses to the signatures of Albert Turner and Arnold Turner:

WALTER GUNN,  
EDWIN H. SETTLE.