G. PETITCOLLIN.

MANUFACTURE OF POINTED CELLULOID RODS.

APPLICATION FILED APR. 10, 1909.

977,326. Patented Nov. 29, 1910.

FIG. 2

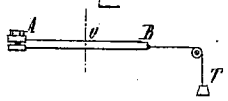


FIG. 3

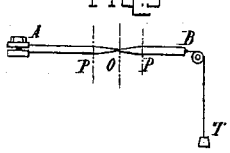


FIG. 5

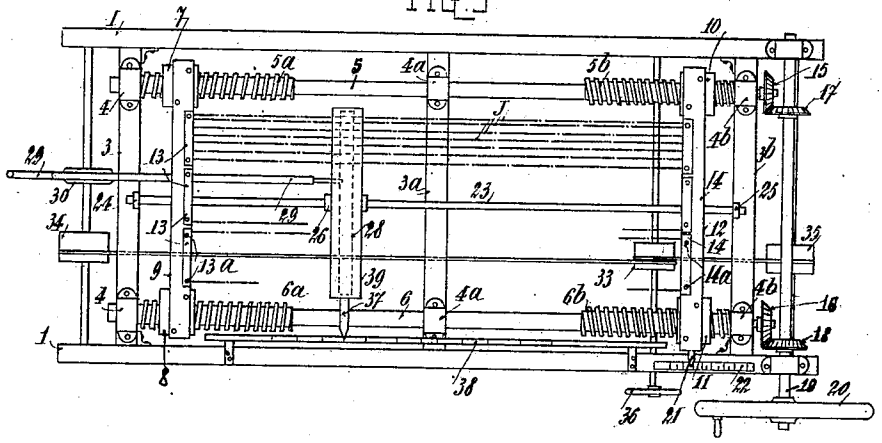


FIG. 6

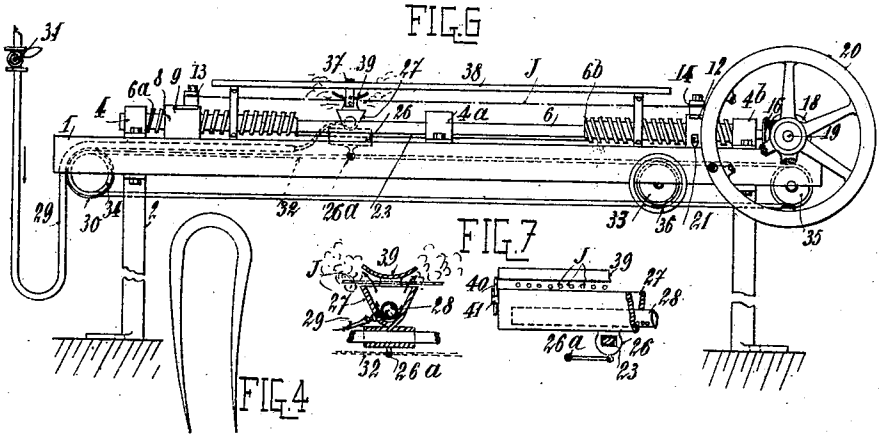


FIG. 4

FIG. 7

FIG. 8

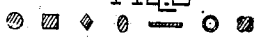
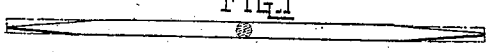


FIG. 1



Witnesses.

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MANUFACTURE OF POINTED CELLULOID RODS.

977,326. Specification of Letters Patent. **Patented Nov. 29, 1910.**

Application filed April 10, 1909. Serial No. 489,137.

To all whom it may concern:

Be it known that I, GUSTAVE PETITCOLLIN, a citizen of the Republic of France, residing at 20 Boulevard Saint Denis, Paris, in the Department of Seine, France, have invented a new and useful Improved Manufacture of Pointed Celluloid Rods, of which the following is a specification.

Up to the present time in order to obtain the blanks of celluloid requisite for the manufacture of hairpins or like articles of tapering form, the following process was adopted. Taking the rods or blanks of celluloid as they were produced at the works, that is to say of calibers differing in diameter but of uniform length and cylindrical form one end to the other, successive lengths were cut off equal to the length of the finished pin or the like. These blanks were hitherto pointed at each end in the manner in which a pencil is sharpened and this operation required more or less time according to the tool employed or the skill of the workman. This pointing was effected by pressing the ends of the blank into a tapering cutting apparatus (a process not applicable to small diameters) or by grinding these ends upon a grindstone or on a grater provided with cutting blades. This very delicate operation requires tools kept in good condition and skilled operatives. Moreover the shavings produced being very fine, form a mass of inflammable and dangerous material. These shavings represent a waste, the proportion of which is very considerable. In addition to the amount removed from the blank there is often another loss of material because the length of the blanks is not always exactly preserved in the length of the part 1.

My present invention relates to a process which obviates these drawbacks and which consists in obtaining by the drawing of the blank with the aid of heat at suitable points, a considerable lengthening of the blank and its sub-division into a certain number of tapering pieces without loss of material and with a regular and symmetrical pointing.

The invention also relates to the practical means of realizing this process in the shape of a machine which permits of the simultaneous working of a great number of blanks, easily controlled, not requiring the intervention of skilled workmen, and consequently securing an actual saving of time, of material and of labor.

Referring to the accompanying drawings, Figure 1 shows a cylindrical blank pointed at each end by removal of the material as at present in use, forming the tapering piece which only requires to be bent into shape to form the hairpin. Figs. 2 and 3 show diagrammatically the means of effecting the process for making the tapering pieces, without loss of material, forming the object of the present invention. Fig. 4 shows by way of example, one form of hairpin made by aid of a tapering blank. Fig. 5 shows a plan view of a machine for drawing out simultaneously a great number of blanks. Fig. 6 is an elevation of the machine shown in Fig. 5. Fig. 7 shows a detail on a larger scale of the heating box. Fig. 8 shows by way of example various sections which the material under operation can take.

Up to this time the blanks or rods of celluloid were first cut in pieces of suitable length (Fig. 1) in order to form a pin by simple bending (as shown in Fig. 4). The points of this pin were made by mechanical means, such as grinding or cutting, and it must be clearly understood that this procedure involves waste of material represented by the part shown in dotted lines in Fig. 1.

According to the process which is the object of the present invention, all waste is done away with, a great economy of material and of workmanship is effected, and for the same length of blank a greater number of pointed blanks are obtained than by the ordinary means.

The process in question is as follows. A given length A B of rod is stretched horizontally (Fig. 2), the one end A of which is fixed and the other end B is submitted to a traction T of requisite amount and in the direction A B. If this traction is less than the limit of resistance of the material employed in proportion to its diameter, no motion will be produced, but if the mass is rendered plastic by heat, for instance, this resistance is lost and it yields to the traction and a drawing out is effected with a reduction of diameter of the part drawn out. If we consider a point O on the rod A B (Fig. 1) and if it be arranged that to the right and to the left of this middle plane and symmetrically the softening of the material shall decrease gradually and arrive at zero at the points P P (Fig. 2), it is obvious that the influence of the traction will only be experienced in the same decreasing proportion.

The rod which was cylindrical from one end to the other will then show after the operation, a diminution or a gradual tapering which will commence at P and reach its maximum O (Fig. 3). If the proportion of diminution is suitably regulated there will be obtained the form of two spindles joined at the points. Consequently if on a rod of any desired length a certain number of points O are marked dividing the total length into any given number of parts, and if traction be applied to the ends of this rod after there has been effected about each point O a softening according to the manner above explained, it is obvious that the material of the rod will be drawn out at these points, and after the operation there will be a rod of greater length and formed of a number of pointed spindles joined at the points. It will then suffice to cut the rod at the junction points, that is to say at the places where its diameter has become the minimum in order to obtain spindles pointed at each end. The material which formerly was wasted in scrapings has been in this manner completely utilized and serves to form the additional length of the spindles obtained.

Various machines may be devised for the practical carrying out of this process. Figs. 5 and 6 of the drawings show a construction of a machine for producing a large number of rods at one time. A frame 1 supported by the feet 2 is crossed by the transverse pieces 3, 3^a, 3^b, having the journals 4, 4^a, 4^b, in which revolve two parallel shafts 5, 6 each ending at their end in screws with opposite threading 5^a, 5^b, 6^a, 6^b. The screws 5^a 6^a have respectively matrices 7, 8 connected to a cross bar 9 and the screws 5^b 6^b bearing the matrices 10, 11 are connected by a cross bar 12. Upon these cross bars are placed jaws 13, 14 clamped by means of the screws 13^a, 14^a, and in which the rods J to be operated upon are gripped at their ends and arranged side by side parallel to the shafts 5, 6. The shafts 5, 6 have each a bevel gear wheel 15, 16 engaging with the gear wheels 17, 18 keyed upon a shaft 19 with a fly wheel 20. By the rotation of the said fly wheel 20 in one direction or the other, there will be effected the approach or the moving apart from one another of the cross bars 9 and 12. A pointer 21 fixed upon the cross bar 12 moves over a scale 22 supported by the frame to indicate the displacement of the cross bars 9 and 12. In the longitudinal axis of the frame of the machine there is arranged a rod or guide 23 supported by the lugs 24, 25 on the cross bars 3 and 3^b. Upon the rod 23 there slides a sleeve 26 which carries a steam heating box 27 which extends transversely under the row of rods. A perforated tube 28 arranged in the length of this box 27 receives steam from a flexible pipe 29 of rubber or the like, which winds upon a drum 30 in proportion to the longitudinal displacement of the box 27. The supply of the steam is regulated by a fixed cock 31. The sleeve 26 is attached to a point 26^a of an endless chain or cable 32 which is coiled upon a drum 33 after having passed over two other tension drums 34, 35 arranged at the ends of the frame. A hand wheel 36 permits the drum 33 to turn and cause the displacement of the sleeve 26 and consequently of the box 27 from one end to the other of the machine. A pointer 37 fixed to the box 27 moves over a scale 38 fixed to the frame and enables the worker to control the displacement of the box 27. The box 27 is surmounted upon the rods by a cover 39 against the lower face whereof the jet of steam impinges and the longitudinal edges whereof are more or less turned up in order, according to their form, to distribute the heat more or less far over the set of rods so as to vary the form of the spindles obtained. This cover has projections 40 adapted to engage with the lugs 41 upon the sides of the box 27. This arrangement permits of the cover being removed in order to facilitate the insertion or the removal of the rods.

The operation of this machine is as follows: By aid of the wheel 20 the cross bars 9 and 12 are brought into the zero position indicated upon the scale 22. This position is so chosen that the distance between the clamps 13 and 14 shall be equal to the length of the row of rods. The clamps are then fixed upon the rods, and by turning the wheel 36 the box 27 is brought against the cross bar 9. The cover 39 is placed on the box 27 and steam is discharged into the tube 28. When the requisite heating has been effected, the wheel 20 is turned until the pointer 21 points to the first division on the scale; this division being calculated according to the size of the part of the spindle which is to be diminished in thickness and according to the coefficient of elongation which is applicable to the material worked. When the required result is obtained, the box 27 is rapidly moved on by aid of the wheel 36 to the first division of the scale 38, the cover 39 is suitably arranged, the operation is recommenced, and so on. The divisions of the scale 38 are calculated according to the size of the pin to be made, taking into account the desired elongation. When the rods are removed from the machine they have the appearance of spindles connected together at their ends, and it is only requisite to cut them and to finish them. It should be remarked that the rods thus treated can very easily be polished beforehand, which produces spindles polished throughout and especially at their ends.

Although only one box 27 is shown on the drawing, it is obvious that a series of

heating boxes can be applied so as to heat simultaneously several points on each rod or blank, as previously explained.

The material treated may be of any section. Fig. 8 indicates several such by way of example.

What I claim is:

1. Apparatus for producing celluloid rods with pointed ends, comprising in combination a frame, a series of clamps on said frame each adapted to grip one end of one of a number of rods arranged parallel, a pair of movable cross bars adapted to carry the said clamps arranged in pairs one at one end of the frame and the other at the other end thereof, screw shafts operatively connected to the said crossbars and adapted on being rotated to cause the crossbars to advance toward or recede from one another, mechanism adapted to actuate the said screw shafts, and heating apparatus adapted to soften the said rods at predetermined points.

2. Apparatus for producing celluloid rods with pointed ends, comprising in combination a frame, mechanism for applying endwise traction to said rods, a carrier parallel with the frame axis, a box adapted to slide on said carrier in proximity to the celluloid rods and means for heating said box.

3. Apparatus for producing celluloid rods with pointed ends, comprising in combination a frame, journaled transverse bars on said frame, screw shafts supported on said transverse bars, matrices adapted to travel on said screw shafts, crossbars attached to and sharing the motion of said matrices, clamps on said crossbars adapted to grip the ends of the celluloid rods, a gage adapted to indicate the amount of displacement of the crossbars, a carrier rigidly supported on the frame and parallel to its longitudinal axis, a plurality of steam heating boxes adapted to slide on said carrier, a pipe adapted to convey steam to each heating box at any point, mechanism for moving the boxes along the carrier and an indicator for each box adapted to show its position.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

GUSTAVE PETITCOLLIN.

Witnesses:

PAUL CAGNET,

H. C. COXE.