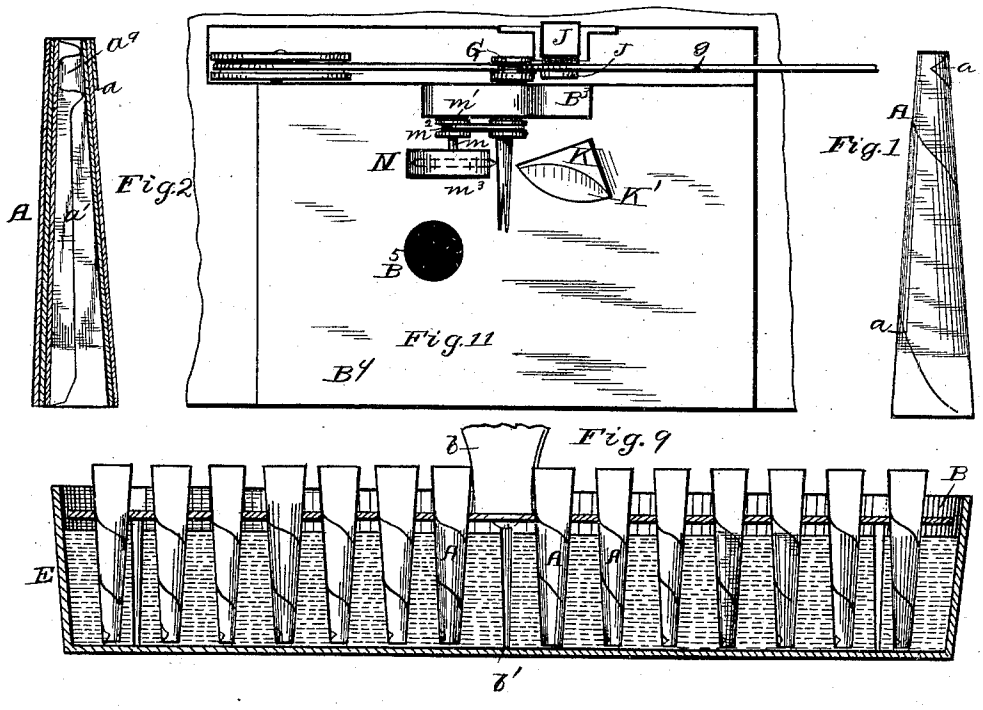
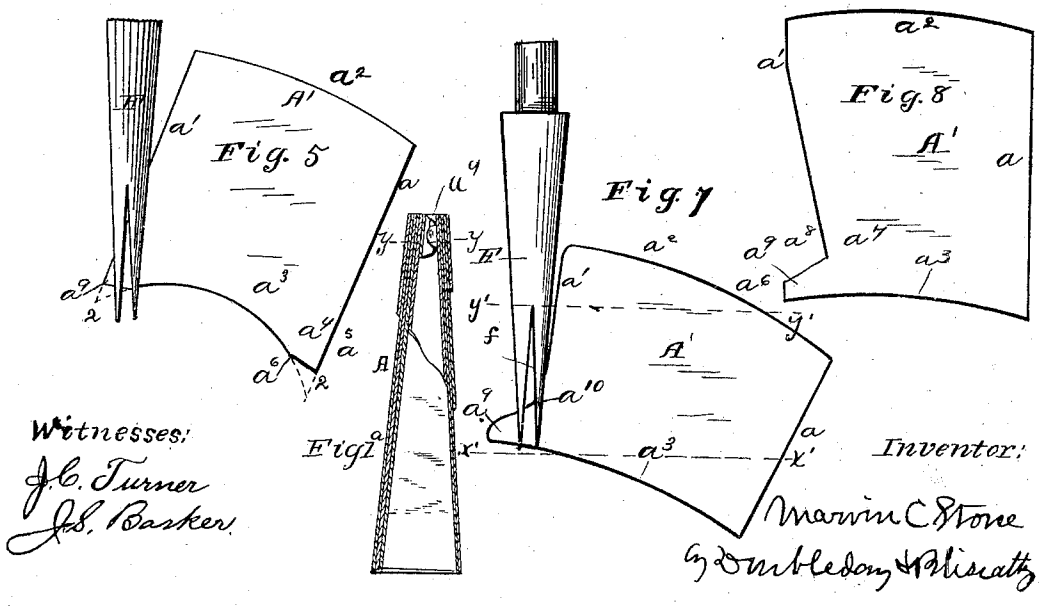
(No Model.) 2 Sheets—Sheet 1.

M. C. STONE.

PROCESS OF MAKING PAPER CONES.

No. 371,988. Patented Oct. 25, 1887.





Witnesses:
J. C. Turner
J. S. Barker

Inventor:
Marvin C. Stone
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(No Model.) 2 Sheets—Sheet 2.

M. C. STONE.

PROCESS OF MAKING PAPER CONES.

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Fig. 13

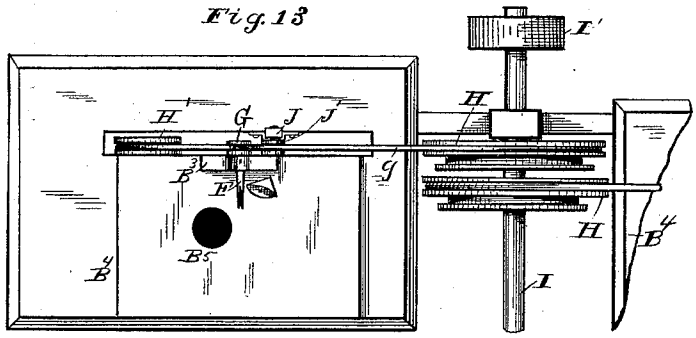


Fig. 14

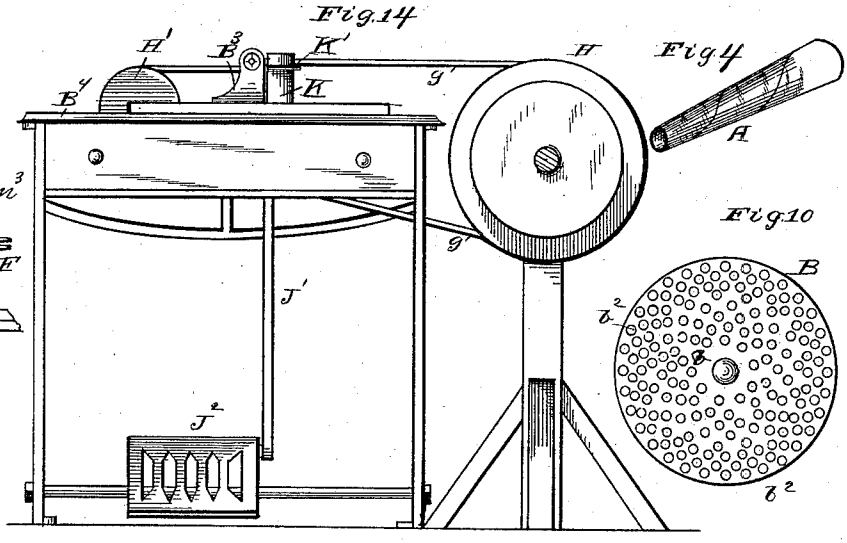


Fig 4

Fig. 12

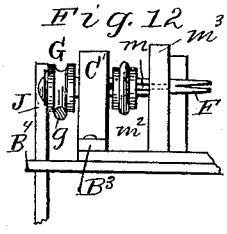


Fig. 10

Fig 3



Fig. 15

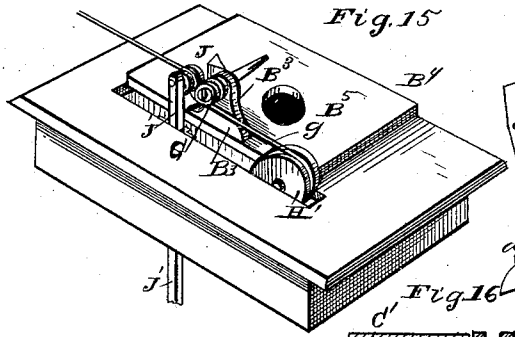


Fig. 6

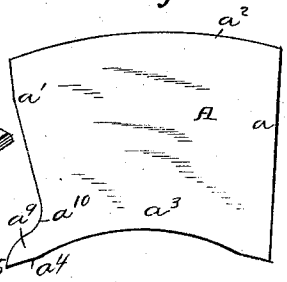


Fig. 16

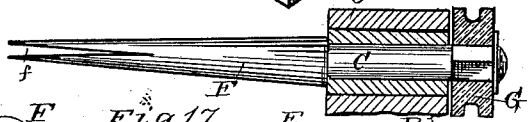


Fig. 17

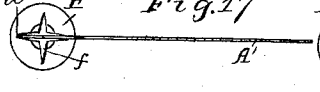
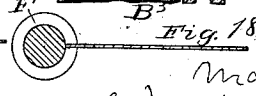


Fig. 18.



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UNITED STATES PATENT OFFICE.

MARVIN C. STONE, OF WASHINGTON, DISTRICT OF COLUMBIA.

PROCESS OF MAKING PAPER CONES.

SPECIFICATION forming part of Letters Patent No. 371,988, dated October 25, 1887.

Application filed May 15, 1886. Serial No. 202,303. (No model.)

To all whom it may concern:

Be it known that I, MARVIN C. STONE, a citizen of the United States, residing at Washington, in the District of Columbia, have invented certain new and useful Improvements in Processes of Making Paper Cones, of which the following is a specification, reference being had therein to the accompanying drawings.

It will be understood that in many respects the apparatus or devices which are employed for carrying out the invention may be varied. For the sake of illustration I have selected devices of the character which I at present prefer to employ and have shown them in the drawings.

Figure 1 is a side elevation of a finished cone. Fig. 1ª is a longitudinal section of the cone shown in Fig. 1. Fig. 2 is a longitudinal section of a slightly-modified form. Fig. 3 is a section on line *y y*, Fig. 1ª. Fig. 4 is a perspective of a cone on a smaller scale. Fig. 5 shows one of the blanks, it being in the position occupied after it is grasped in the former at the time of beginning the act of coiling. Fig. 6 shows another form of blank, and Fig. 7 illustrates it when in the initial position of the operation of coiling. Fig. 8 shows a modified form in the blank. Fig. 9 illustrates the method of holding and gaging the tubes while being subjected to treatment after they have been formed. Fig. 10 is a top plan of the holder and gage on a smaller scale. Fig. 11 is a top plan view of a mechanism for forming the cones. Fig 12 is an end elevation of the devices in Fig. 11. Fig. 13 shows the method of driving two opposite machines. Fig. 14 is a front elevation thereof. Fig. 15 is a perspective from the rear. Fig. 16 is a side elevation of the "former" and a section of the devices which carry it. Figs. 17 and 18 are sections on lines $x' x'$ and $y' y'$, Fig. 7.

Figs. 1, 1ª, 2, 3, and 4 show the cones which I produce. Each of these is made by wrapping paper so that there is produced a sufficient number of folds or layers thereof. By referring to Figs. 1ª, 2 it will be seen that the wall of the tube becomes gradually thicker from one end toward the other, the paper being so wrapped that the exposed edge forms a spiral whose coils are arranged to thus increase the thickness.

The blank may be shaped to produce several outer coils of the exposed edge, as shown in Figs. 1, 1ª, and 4, or the outer edge may be more nearly straight, as in Fig. 2.

The conical tube shown is particularly applicable for a mouth-piece for a cigar or a cigarette, and such use illustrates well many others to which can be put articles having the features of that herein. The smaller end is liable to be crushed, and therefore it is necessary to have it thicker and stronger, whereas the larger end can to advantage be left thinner, in order that it may be sufficiently flexible to conform to the article to which it is attached.

a^9 represents a projection or cross-piece inside of the tube and at or near one end thereof. This can be used to act as a stop, so that when one tube is inserted into or "nested" in another the inner one shall be prevented from tending to crowd through the end of the outer. This feature is not necessary, however, in the finished article; but for some purposes I prefer to retain it.

At present I prefer to employ a blank having more or less of the features illustrated in Figs. 5, 6, 7, and 8, it being represented generally at A′. That in Fig. 5 has two side edges, $a\ a'$, an upper curvilinear edge, a^2, and a lower edge, $a^3\ a^4$. The edge a^2 conforms to an arc of greater radius than the edge a^3 at the lower end in Figs. 5 and 6, while in Figs. 7 and 8 the curves at a^2 and a^3 are substantially similar. The edges a^4 between the points a^5 and a^6 in Figs 5 and 6 are of the same curvature as the edge a^2.

The blank can be readily gripped in a former by treating one of the corners at the lower end as a lateral projection and winding or wrapping the other (larger) part of the blank around it. In some cases this is suitable; but it will be seen that the said lower corner of blank A′ in Fig. 5 will lie across the interior chamber of the tube throughout a considerable portion thereof longitudinally; hence when it is desired to insert one tube into another to make a large number occupy a small space the inserted end of the inner tube cannot pass over a large part of said distance longitudinally. To obviate this—that is, where it is desirable to utilize as much as possible of the interior chamber of the tube

either for holding other tubes or holding other articles—I give to the blank a peculiar conformation, as shown in Figs. 6, 7, and 8—that is to say, I form upon one side a tongue or projection, a^9, this being provided by indenting one side in the form shown in last said figures. The blank in Fig. 8 has a sharp angle at a^7, produced by cutting away the part at a^8. This form is suitable for some purposes, as the tongue a^9 can be readily inserted into and grasped by the former, and when the article is completed this tongue forms the above-described cross-piece a^9, Fig. 2; but on account of the narrowness at the line of junction of the tongue a^9 with the main body of the blank there is a liability for it to be torn loose when another tube or other material is forced into the tube having such a tongue; hence I at present prefer a blank of the character shown in Figs. 6 and 7, in which there is a curve at a^{10}, instead of a sharp angle, such curve permitting a sufficient indentation to form a tongue, and at the same time preserving sufficient width at the line of junction to prevent tearing when the tube is used as above indicated.

Of course it will be understood that in all respects with relation to the blank—that is, with relation to the conformation of the edges and the tongues—there may be much variation without departing from my invention.

With some articles the tongue or lateral projection may be situated more nearly in the middle—as, for instance, when the tube is to be more nearly cylindrical. After the tube has been formed and the outer edge thereof secured I subject it to treatment in order to attain several ends which are either or all of the following, namely: causing the folds or coils of paper to thoroughly adhere, rendering said folds or coils and the tube or a part thereof more translucent or transparent, making stiffer and harder a part or all of the tube, imparting a color thereto, as well as translucency or transparency, and imparting a flavor or agreeable scent thereto. Preferably, I accomplish all of these ends simultaneously by subjecting the tubes to the action of a material or composition of materials adapted to attain them. At present I employ paraffine as the main body of said material, this possessing such properties that it will cause the layers or folds to adhere tightly together, stiffen and strengthen the tube, and render the folds of paper and the wall of the tube translucent or transparent. This paraffine can be tinted with any desired color, and with it may be mixed any flavoring or scenting material which is preferred.

Referring to Figs. 9 and 10, B represents a plate provided with perforations b^2, adapted to receive the tubes A, which latter pass through the apertures a certain distance and then are stopped. The plate B is shown as having a handle, b, and legs b'. After the tubes have been inserted into the apertures b^2 this holder is placed in a vessel, E, containing the material for effecting the treatment. If this is paraffine, the heating thereof can be effected in any desired way, as by a direct fire, by steam-pipe, &c. The plate B can be used as a gage to regulate the height to which the paraffine shall be applied. The latter rises into the tube, more or less permeates the paper, and passes between the folds thereof.

I prefer to have the paraffine heated to about boiling, in which case the tubes need not be immersed more than about two minutes under ordinary circumstances. After such an immersion they are withdrawn and allowed to remain in the holder until the paraffine has hardened sufficiently, when they can be removed and are ready for use. When the paraffine has again become hard, it causes the folds or layers to adhere strongly together, it, in fact, making the whole wall of the tube substantially one homogeneous mass. Moreover, the particles of the paraffine in cooling assume such position relatively to each other (the process being more or less similar to crystallizing) that they stiffen and strengthen the tube and adapt it to resist fracture and compression. Again, the paraffine imparts to the tube an ornamental and tasty appearance, as the latter is rendered translucent and even transparent, though use be initially made of very opaque paper.

If a material is used which is liable to impart an unpleasant taste or odor to the tubes, this may be overcome by either adding to the material another for imparting a pleasing odor or flavor or the tubes may be subsequently treated for this purpose. I color them also either by tinting the material which renders them hard or translucent or by tinting them at a different stage in the treatment.

I am aware of the fact that paper has been treated with wax, paraffine, and other materials and afterward worked up into various forms, the paper at the time of the aforesaid treatment with wax or paraffine being in the form of sheets, strips, or blanks.

Referring to Fig. 3, it will be seen that but a portion of each tube is submerged, this being that part at the lower end. By thus treating only a part of the tube I can not only make it more ornamental, but can attain certain ends when the tube is used for some purposes—for instance, as mouth-pieces for cigars, cigarettes, &c. This is desirable.

The paraffine melts at a comparatively low temperature, and to avoid any injurious effect which might arise from its being melted or softened by the heat of the cigar or cigarette I prefer to paraffine only the end intended to be put into the mouth. If it were applied to the other end also, an unpleasant flavor or odor always arises when the nearer end of the cigar or cigarette is burning.

I do not herein claim, broadly, the application of paraffine over the entire length of a paper tube—that is to say, the complete immersion of the tube therein; but I have found that such treatment is very disadvantageous

for some purposes. This method of treatment can be used in producing other tubular or conical paper articles besides such mouth-pieces as are mentioned.

I will now describe one form of apparatus by which the supplying of the blanks and the coiling thereof can be effected.

B^3 represents a standard on a table, B^4, this standard having a shaft or spindle, C, mounted in a bearing at C'. This part C carries a former or mandrel, F, secured to or formed therewith. This former may be of any desired shape, that shown being conical. In it are formed one or more slots, *f*, adapted to receive the projecting part of the paper blank. (See Fig. 7.) As shown in the drawings, there is a flaring mouth at the end of the slot *f*, and by having it made in this way the inserting of the blank is much facilitated. The slot can gradually widen from the inner end, or the walls may be parallel at that part.

In a machine requiring some hand operation I prefer to have two through slots, so that there will be an opening for the blank whatever side of the former may happen to lie toward the operator's hand. As shown, the spindle C has a wheel, G, secured thereto, and with this a belt, *g*, is adapted to intermittingly engage. The belt is driven by wheel H on a shaft, I, and wheel H', receiving power through a band-wheel, I'. Referring to Fig. 13, it will be seen that two tables may be placed on opposite sides of shaft I, and by arranging them in rows on each side of the shaft any desired number can be driven thereby. However, any other suitable mechanism may be used to operate the belts.

In order to apply the belt *g* to the wheel G a stop-movement is employed, by which the spindle can be instantly put into rapid motion and as instantly stopped.

J represents a movable pulley adapted to engage with the belt and move it toward the wheel G. It is carried by a sliding bar, J', operated by a treadle, J^2, within reach of the operator's foot. The operator sits or stands facing the small end of the former F, and while the latter is stationary inserts a blank, as shown in Fig. 7. (Previously paste has been applied along the edge *a*.) After the grip of the former is insured the treadle is moved and the bar J' pushes pulley J and the belt *g* up, whereupon the former is at once rapidly revolved, and the blank is immediately coiled into a tube, it being guided by the operator's hand. As soon as the tube is completed, it is slipped from the former and dropped through the orifice B^5 into a receptacle. To assist in guiding the blank properly relative to the former, use may be made of a device more or less similar to that at K K', K being a standard rising from the table, and K' being a shelf thereon at a suitable distance from the top. (See Figs. 11 and 14.) The front surface of the standard above the shelf is concave, conforming more or less to the curved edge a^2 of the blank.

Although, as above said, the peculiar conformation of the upper edge of the blank insures that when the tube is completed the edges of the several folds or coils at said upper end shall lie in the same transverse plane, (see Figs. 2 and 3,) under some circumstances I prefer to employ a knife suitably arranged to cut the end to produce a smooth edge, if by any chance an irregular end should be formed. For this purpose any suitable cutter can be employed. One is indicated at M, it being mounted on a spindle, *m*, carrying a pulley, m^2, which is driven from the spindle C by a wheel, m^4, and a belt, *m'*. As shown, the knife is covered by a shield, m^3, to avoid accident. It may be situated upon the other side of the former F. All of these devices, however, can be modified, and many may be omitted, without affecting the other parts of the invention.

I herein refer to pasting one edge of the paper blank; but in respect to this step in the method there can obviously be modification without departing from the spirit of the invention. The best results are attained by having the edge last wrapped caused to smoothly adhere to the inner folds; but the width of surface over which the paste is applied is immaterial.

It will be understood that the method of using the apparatus which particularly characterizes this case is not the only one which can be followed with the mechanism shown. For instance, the paper need not be inserted into the interior of the cone, but can be wrapped around the outside entirely; but I do not herein make claim to such a mode of manipulating the apparatus by itself considered; but this or any other now well-known manner of wrapping the paper can (so far as that particular step in the present method is concerned) be followed. So, too, the cone can be rolled around on a table in contradistinction from having it mounted on a stationary axis—that is, in bearings at one end; but I do not claim this last mode of using it herein by itself considered, as this, also, is one of the now well-known ways for wrapping the paper. In short, other processes than that herein claimed can be carried out in the mechanism shown, and various parts of the latter can be modified or omitted or have others substituted in pursuing the method forming the subject-matter hereof. Thus, as concerns keeping the cones isolated from each other while paraffining them, it is not necessary that they be wrapped upon a power-driven mandrel or former, as the latter can be held and operated by hand as regards the subsequent treatment. So, too, the keeping of the cones isolated during the paraffining can be accomplished by other devices than the perforated plates shown, though that is the preferred means for accomplishing this part of the process.

I do not herein make claim to any of the blanks by themselves considered, having filed other applications therefor — to wit, No.

200,487, April 28, 1886, and No. 202,828, May 20, 1886—nor to the devices or the process for effecting the paraffining separately considered, having made these the subject-matter of another application, No. 202,829, May 20, 1886, nor to the mechanism or devices for cutting the paper blanks or those for supplying or pasting or wrapping them, having made these the subject-matter of other applications—namely, No. 202,200, May 14, 1886, and No. 186,216, filed December 18, 1885.

What I claim is—

1. The herein-described improvement in the art of making paper cones which are open at both ends, it consisting in cutting a blank with curved upper and lower edges, pasting one edge of the blank, wrapping said blank around a cone-shaped former which is caused to revolve rapidly about a stationary axis, causing the edge last wrapped to adhere by means of the paste to the inner folds, and then continuing the rapid rotation through a long series of revolutions after the pasted parts adhere, and subsequently inserting the cone into a mass of paraffine, substantially as set forth.

2. The herein-described improvement in the art of making paper cones which are open at both ends, it consisting in pasting one edge of the paper forming a blank having a convex upper edge and a concave lower edge, pasting one edge of the paper blank, and subsequently inserting a part of the blank into the interior of a cone-shaped former by passing it through the small end thereof, then revolving the former until the paper is crimped or bent into cone form and until the edge last wrapped is caused to adhere by means of the paste to the inner fold, then continuing the rotation of the former, and then sliding out longitudinally through the small end of the cone-former the part inserted into the interior of said former, substantially as set forth.

3. The herein-described improvement in the art of making and treating paper cones which are open at both ends, it consisting in pasting one edge of the paper, wrapping the paper around a former to produce paper cones, then securing said cones separately from each other in or on a holder, whereby they are properly gaged, and then applying paraffine to the smaller end only of each cone, they being supported by the said holder or gage, substantially as set forth, to prevent the paraffine from being applied throughout their entire length, as described.

In testimony whereof I affix my signature in presence of two witnesses.

MARVIN C. STONE.

Witnesses:
B. W. SOMMERS,
M. P. CALLAN.