(No Model.) 2 Sheets—Sheet 1.

M. C. STONE.

MACHINE FOR MAKING PAPER CONES.

No. 547,969. Patented Oct. 15, 1895.

Fig. 3.

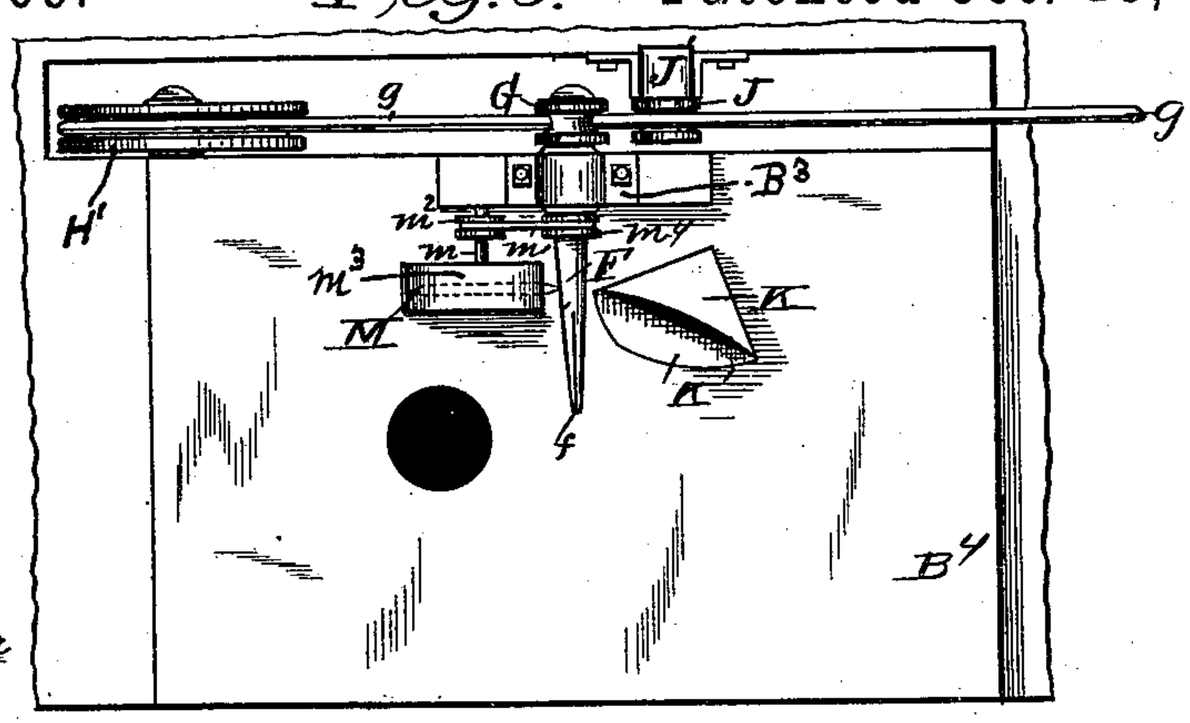


Fig. 2

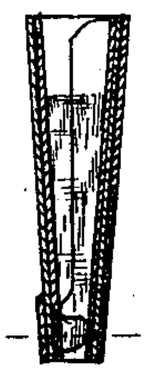


Fig 2a

Fig. 1

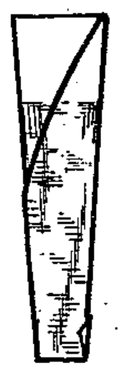


Fig. 4

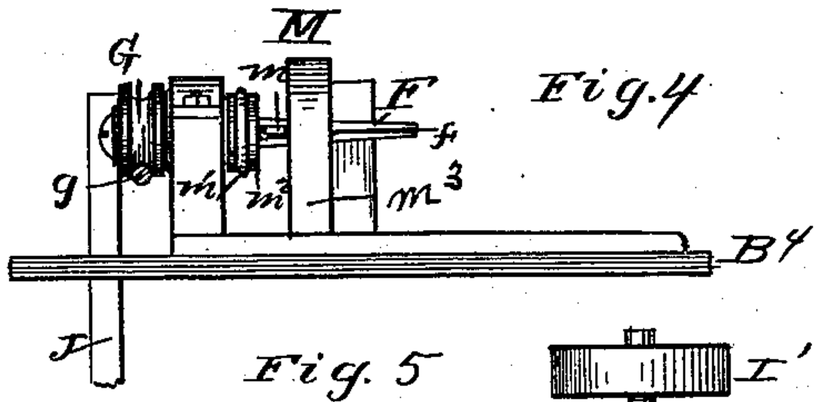


Fig. 5

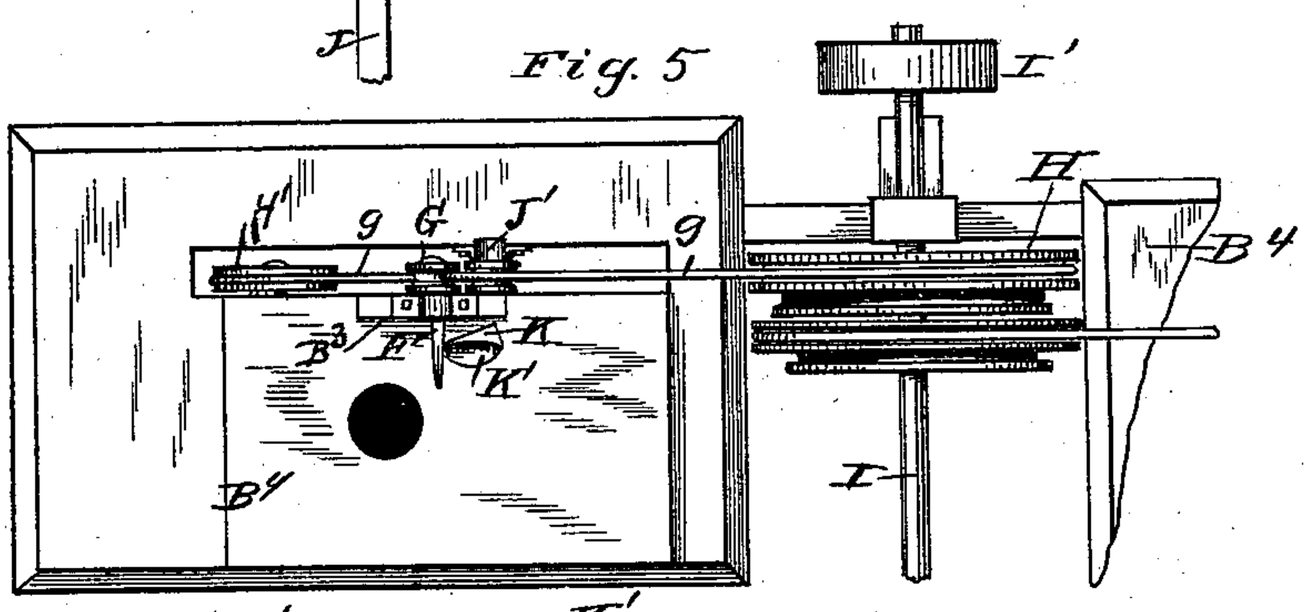
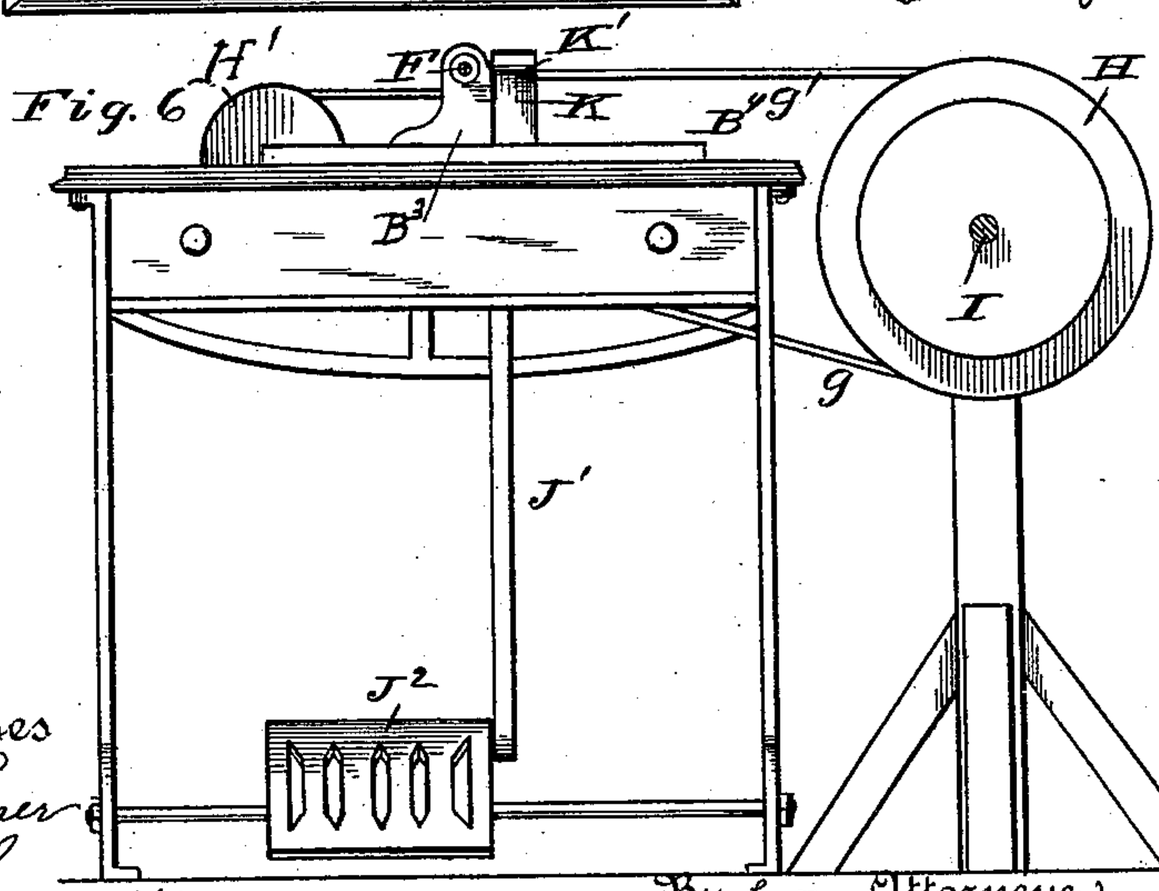


Fig. 6



Witnesses
J. C. Turner
B. A. Sommer

Inventor
Marcus C. Stone
By his Attorneys Dodge & Bliss

(No Model.) 2 Sheets—Sheet 2.

M. C. STONE.

MACHINE FOR MAKING PAPER CONES.

No. 547,969. Patented Oct. 15, 1895.

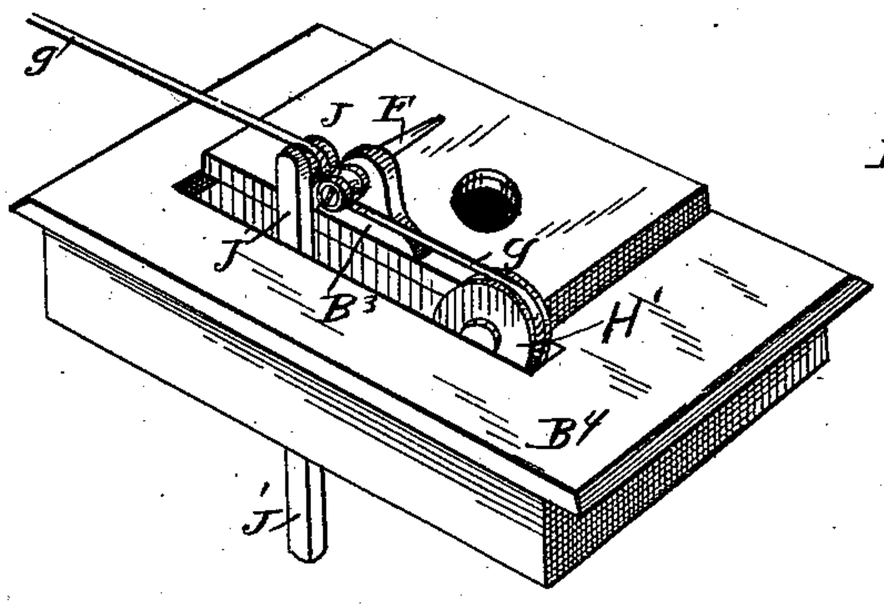


Fig 7

Fig 8

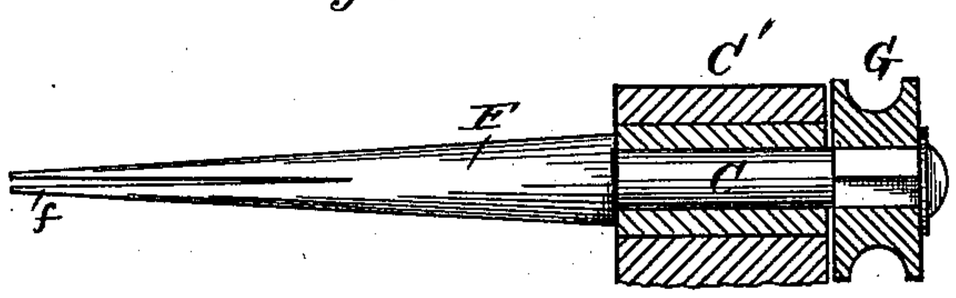


Fig. 10

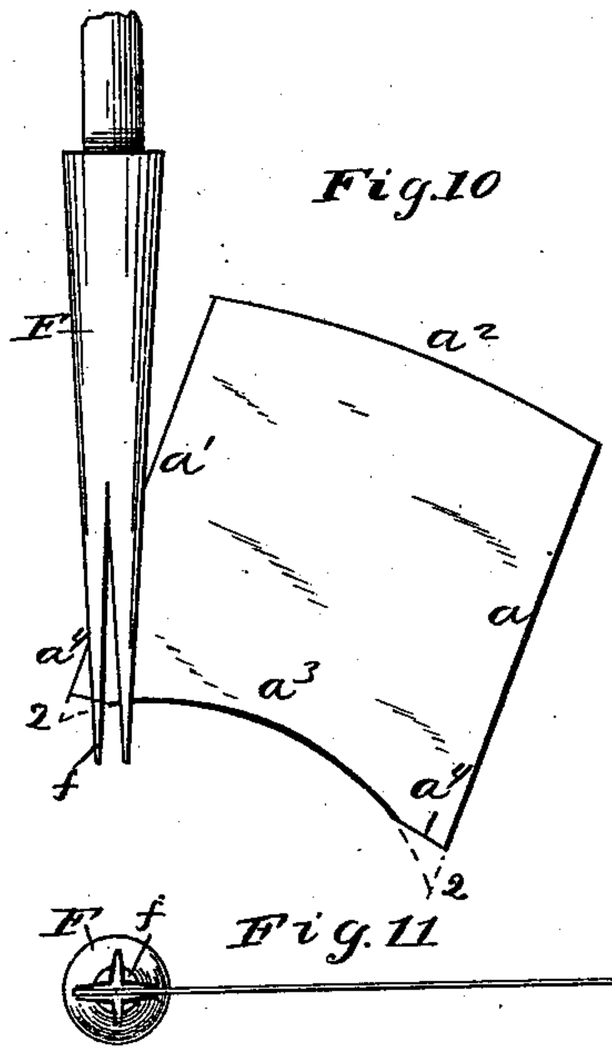


Fig. 11

Fig. 9

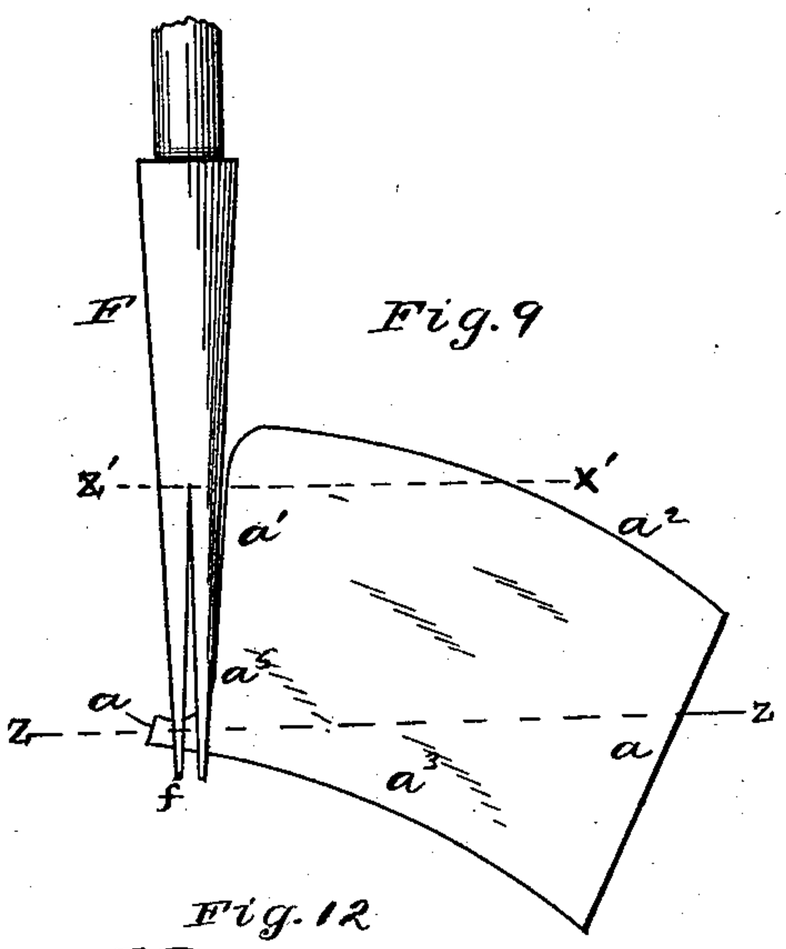
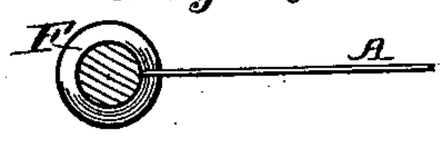


Fig. 12



Witnesses
J. C. Turner
B. N. Sommer

Inventor
Marvin C. Stone
By his Attorneys
Doubleday & Bliss

UNITED STATES PATENT OFFICE.

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

MACHINE FOR MAKING PAPER CONES.

SPECIFICATION forming part of Letters Patent No. 547,969, dated October 15, 1895.

Original application filed December 18, 1885, Serial No. 186,218. Divided and this application filed May 14, 1886. Serial No. 202,200. (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 Machines for Making Paper Cones, of which the following is a specification, reference being had therein to the accompanying drawings.

Figure 1 is a side elevation of a finished cigarette-holder on an enlarged scale. Fig. 2 is a longitudinal section thereof. Fig. 2^a is a section on the line *y y*, Fig. 2. Fig. 3 is a top plan view of a mechanism embodying my improvements. Fig. 4 is an end elevation of the devices in Fig. 3. Fig. 5 is a top view showing the method of driving. Fig. 6 is a front elevation thereof. Fig. 7 is a perspective from the rear. Fig. 8 is a side elevation of the "former" and a section of the devices which carry it. Fig. 9 illustrates the blank and the former when in the initial position in the operation of coiling. Fig. 10 shows a modified form of blank. Fig. 11 is a section on line *z z*, Fig. 9. Fig. 12 is a section of the former inside of the slot.

I have shown a form of machine such as I at present prefer to employ; but it will be understood that the essential features thereof may be embodied in devices of other general forms.

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 a projecting part of the paper blank. (See Figs. 9, 10, and 11.) 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. Again, I prefer to so form the slot that it shall have a flaring mouth at the end, as the inserting of the paper is thereby much facilitated. The walls of the slot can widen from the inner end or can be parallel at that end.

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, receiving power through a band-wheel I′, there being a wheel at H′, over which the belt passes, to return.

Referring to Fig. 5, 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. A driving mechanism of this character is very advantageous, in that it does not have a positive engagement or connection with the former. Hence the latter can be stopped or retarded without materially affecting the driving parts, and the said parts can continue in rapid movement after such stoppage. The operator is at liberty to apply much or little pressure to the paper while it is wrapping without there being any danger to the hand which is against the cone. I do not wish to be limited to all of the details which I have shown as comprised in this part of the mechanism. The object is to provide a non-positive driver and means adapted to quickly throw it into and out from that position occupied when driving the cone.

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 Figs. 9, 10, and 11. (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.

It will be seen that power-transmitters of other forms than the belt *g* may be used, such as a series of gear-wheels and friction-clutch, though I prefer the means shown for

intermittingly transmitting the power from the continuously-rotating shaft to the former. It will be also seen that other means may be used for connecting the treadle to the belt or power-transmitter.

I am aware of the fact that large articles, like paper bags, have been wrapped on a power-driven conical former, said former having been so arranged that it revolved only about (or a little more than) one complete revolution and then returned to the starting-point. Such a mechanism is not effective where it is necessary to bend a stiff paper into a cone of very short cross-diameter, as in making cigarette-mouthpieces. Great difficulty is met with from the fact that the paper, which must be thick and stiff to attain the best results, refuses to remain in its curved form after the bending, and this difficulty is still encountered even when the strongest glue is used, and hence heretofore they have had to use thin soft paper in the manufacture of cigarette-holders.

My mechanism differs very materially from those heretofore used in several respects. The parts are so arranged that the operator has full control of the number of revolutions the cone shall make, and, hence, after the last edge is pasted, he can continue the exceedingly-rapid rotation of the former through a large number of revolutions, and thereby effect a thorough bending or crimping of the stiff paper, so that any ordinary paste is fully efficient to hold the layers together. During these rapid revolutions, after the last edge is pasted, some of the paste is forced to the outside and is instantly distributed over more or less of the surface of the paper, and this assists in crimping the paper, and as the thin film of paste almost as instantly dries it assists also in "fixing" or "setting" the curved shape of the cone. Again, I employ no fingers or projections to grasp the paper as is done on the machines with "cone-formers" heretofore used.

I find that the pressure for shaping the paper cone can be attained with the greatest efficiency by the human hand, and in order to be able to use it with impunity I employ a cone-former, which is smooth-surfaced, except in so far as its surface is broken by the slots—that is to say, I have no projections extending beyond the surface of the cone, and I effect the grip by inserting a part of the blank into the space surrounded by the walls of the cone in contradistinction from a tangential grip or a grip effected at the surface of the cone. The inserting may be done by moving the paper on radial lines—that is to say, by passing it in through the side of the former; but I prefer to pass it in through the small end of the cone, the paper moving in on lines parallel to the axis. In either case that part of the paper which has been (during the coiling and pasting operation) lying inside of the cone is withdrawn by sliding it out on the longitudinal lines of the cone. So far as concerns this manner of securing a grip upon the paper by passing it through a slot at the small end of the cone it will be seen that it can be accomplished independently of the mounting of the cone, and that these advantageous features will be maintained even if a cone-former be used adapted to be held in the hand, if it (the former) has a slot of the character substantially as described. In another respect my machine is better adapted for making these small articles by hand than the cone-making machines heretofore used. I apply the power directly to the spindle by a loosely-engaging belt, so that the rotation of the cone can be slackened, increased, or instantly stopped, according as the operator applies more or less friction, and this, too, independently of the "stop movement" proper J J′ J². When the cone is revolved by gearing or positive devices, the speed is fixed, and also the number of revolutions, which is objectionable in a machine of this character.

As a general result of my construction and arrangement of parts, the mouthpieces can be made by hand with a rapidity much greater than that incident to the automatic machines which have been used for making paper cones.

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. 3 and 6.) The front surface of the standard above the shelf is concave, conforming more or less to the curved edge a^2 of the blank.

I do not wish to be limited to the details of the table, the shafting, and other parts, as they can be varied. I prefer to have the blank shaped as shown; but this, too, can be changed without departing from the spirit of the invention. The blank in Fig. 10 has side edges a and a' nearly parallel, the top edge a^2, and the bottom a^3, the top being convex and the bottom concave. As shown in Fig. 10, short edges a^4 are made between the edge a^3 and the edges a and a', the points at 2 2 being thus cut away.

In Fig. 9 another form of blank is shown. In this case the top a^2 and the bottom a^3 are described by curves of the same radius. At a^5 there is an indentation, the edge a' through a part of its course running toward the edge a. This insures that the inner face of the paper cones shall be of such character that one of them can be easily inserted into another, as in "nesting," an operation which cannot be so easily accomplished when the cones are made of blanks having the edge shown in Fig. 10, inasmuch as there is a comparatively large part of the blank lying in the cone-former F, and therefore the same part will lie across the interior of the finished holder.

By cutting away a part of the blank, as in Fig. 9, and forming a tongue or projection, as

at a^9, I provide means for readily gripping the paper and at the same time insure the easy "nesting" above referred to. By having the upper edge and the lower formed on the same curve I save paper, for at one and the same cut of the die I form the lower edge of one blank and the upper edge of the next. The curvature of these edges is such as to have the ends of the holder true, all the parts of each end lying in a plane square across the axis of the cone.

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. 1 and 2,) yet 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 pinion 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.

I do not herein make claim to any of the subject-matters constituting the claims in my application, Serial No. 186,218, filed December 18, 1885, and my application, Serial No. 202,303, filed May 15, 1886, the present case being a division of the aforesaid application, Serial No. 186,218; but I reserve the right to claim therein, or in other divisions thereof, matters herein alluded to but not herein claimed.

I do not herein claim the blanks shown for forming the cones, having made them the subject-matter of other applications, Serial Nos. 200,487 and 202,828.

I am aware of the fact that machines have been proposed for making cylindrical tubes and comprising continuously-moving power mechanism, an intermittingly-moving power transmitter, and a tripper to stop the motion of the latter when a certain thickness of paper has been reached.

To accomplish one of my purposes it is necessary that the operator should have continual control of the movements of the former, so that it may be allowed in one case to rotate more or less than in another, inasmuch as the blank papers vary in respect to their elasticity and the rotation must continue until the creasing is thoroughly effected and the paste is compelled to adhere properly. In using the machine herein the former is revolved many times after the last convolution of paper is wrapped; and the machine therefore differs radically from those of the sort above referred to, which provide for an automatic tripping of the power devices as soon as a certain thickness of paper is reached. In another respect the present machine differs materially from the earlier only—namely, in this, that the machine can be arranged so that there is no obstruction whatever around the smaller end of the former, whereby the hands of the operator can be brought close to it and on all sides, so as to utilize the pressure of the human hand for effecting the compression and crimping of the blank. I have found that the operatives become very expert, and by using the hand for this operation the time, varying as above said, when the crimping and fastening have been accomplished, can be instantly detected, at which time the operative quickly withdraws the cone and applies another blank. Consequently, out of the thirty to fifty thousand cones which each of the operatives can make in a day there are exceedingly few which are faulty or refuse to adhere properly and retain the desired shape. I have never been able to reach such perfection when using the machines with which I have experimented, which had automatic or mechanical compressors and former stopping and starting mechanisms.

I am aware also of the fact that use has been made of both conical and cylindrical formers or mandrels; but the formers of both sorts have had throats, entrances, or passages, which were as long as the initial edges of the strips of paper—that is, the edges which are first fed to the formers—and the whole of each of said edges was introduced; but I aim to provide a cone which shall be free of projections or obstructions throughout the greater part of the interior, and to accomplish this I provide a throat or passage to receive only a part of the edge of the blank, it being shorter than said edge, or, in other words, provide a gripping finger or fingers at the smaller end of the former with a passage or throat to receive a part of the edge of the blank (preferably the corner part of the portion which forms the small end of the cone) and above said gripping device and passage provide a stop which limits the passage of the blank toward the axis of the former. As shown, such stop is provided by the solid part of the former above the slots and fingers, but I do not limit myself to that form of stop. I provide, preferably, two through-slots, which lie in intersecting planes, and consequently a passage-way or entrance between the gripping-fingers is provided, no matter at what place the former or mandrel stops. If only a single slot is used, mechanism must be combined with the mandrel to compel it to stop every time at the same predetermined place; but I not only dispense with such mechanism, but aim to avoid such result—that is, provide for the stopping and starting of the cone at any instant and at any place. There are virtually four entrances, formed by means of the two through-slots so that in whichever position the mandrel stops one of them will be ready to receive a blank.

What I claim is—

1. A former or mandrel for wrapping a paper cone, it having a cone shaped portion with two unobstructed slots or openings extending continuously through both sides and the smaller end, said slots being in intersecting planes and widening toward the smaller end, substantially as and for the purposes set forth.

2. In a paper cone making machine, the combination of an intermittingly acting power transmitter, a stop and start mechanism controllable by the operator, and a conical former or mandrel rotated by the power transmitter, and having at its smaller end two through slots in intersecting planes, whereby a substantially horizontal passage shall always be presented for the paper at the sides of the former, independently of its axial position, substantially as set forth.

3. The combination of the cone shaped former rotating intermittingly in but one direction, the continuously revolving power shaft, the belt, a reciprocating pressure pulley, as at J, for the belt, and a treadle connected to the pressure pulley, substantially as set forth.

4. In a paper cone making machine, a cone shaped former rotating intermittingly in one direction only and slotted at its smaller end, which end has an unobstructed space around it whereby the hand of the operator has free access, in combination with a bearing for said former wherein it is mounted stationarily relatively to said bearing, and power devices for rotating it, substantially as set forth.

5. The combination with the power devices, the cone shaped former, and the wheel G, of the loosely engaging belt *g*, wheel H wheel H′, and means within reach of the operator's foot for intermittingly bringing the belt into and out of the position occupied when it is driving the former, substantially as set forth.

6. In a paper cone machine, the combination with the power devices, of the cone shaped former revolving intermittingly in one direction only and provided with a paper receiving throat or entrance which is shorter than the active part of the cone surface, substantially as set forth.

7. In a paper cone machine, the combination with the intermittingly rotating cone shaped former, and the power wheel, said former and wheel having their axes in different longitudinal vertical planes, of the power transmitter, and means supplemental thereto, under the control of the operator for intermittingly connecting the power transmitter with the former, substantially as set forth.

8. In a paper cone making machine, the combination of a continuously rotating power shaft, a cone shaped former rotating intermittingly in but one direction, a table or support for said former arranged substantially as described to provide a free space around the small end of the cone, whereby the hands of the operator can be brought into immediate proximity to it, the power transmitter adapted to connect said former with said shaft, and a treadle below the former within reach of the operator's foot and connected to said power transmitter, whereby the former can be allowed to rotate for varying periods, substantially as set forth.

9. In a paper cone machine, a cone shaped former rotating intermittingly in one direction only and provided with a through slot at its smaller end and with a solid portion above the slot to abut against the larger part of the paper cone, substantially as set forth.

10. In a paper cone machine, a cone shaped former constructed to engage with the end part of a blank or strip, and having a throat or entrance for said blank shorter than said former, and a driving mechanism intermittingly rotating said former, substantially as set forth.

11. In a paper cone machine, a cone shaped former constructed to engage with the edge of a blank at the corner part of the portion which forms the smaller end of the cone, said former having one or more fingers at the smaller end to engage said corner, with a gripping throat shorter than the said former, in combination with an intermittingly acting power transmitter to rotate the former, substantially as set forth.

12. In a paper cone machine, a cone shaped former constructed to grip part of the edge of a blank or strip, said former having at the smaller end a throat or passage wherein said part of the blank can be received, and having above said passage a stop for the upper part of said edge of the blank, in combination with an intermittingly acting power transmitter to rotate the former, substantially as set forth.

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

MARVIN C. STONE.

Witnesses:

B. W. SOMMERS,

M. P. CALLAN.