J. C. MÜLLER.

PROCESS FOR MAKING MOUTHPIECE TUBES.

APPLICATION FILED OCT. 29, 1910.

985,365.

Patented Feb. 28, 1911.

2 SHEETS—SHEET 1.

Fig. 1.

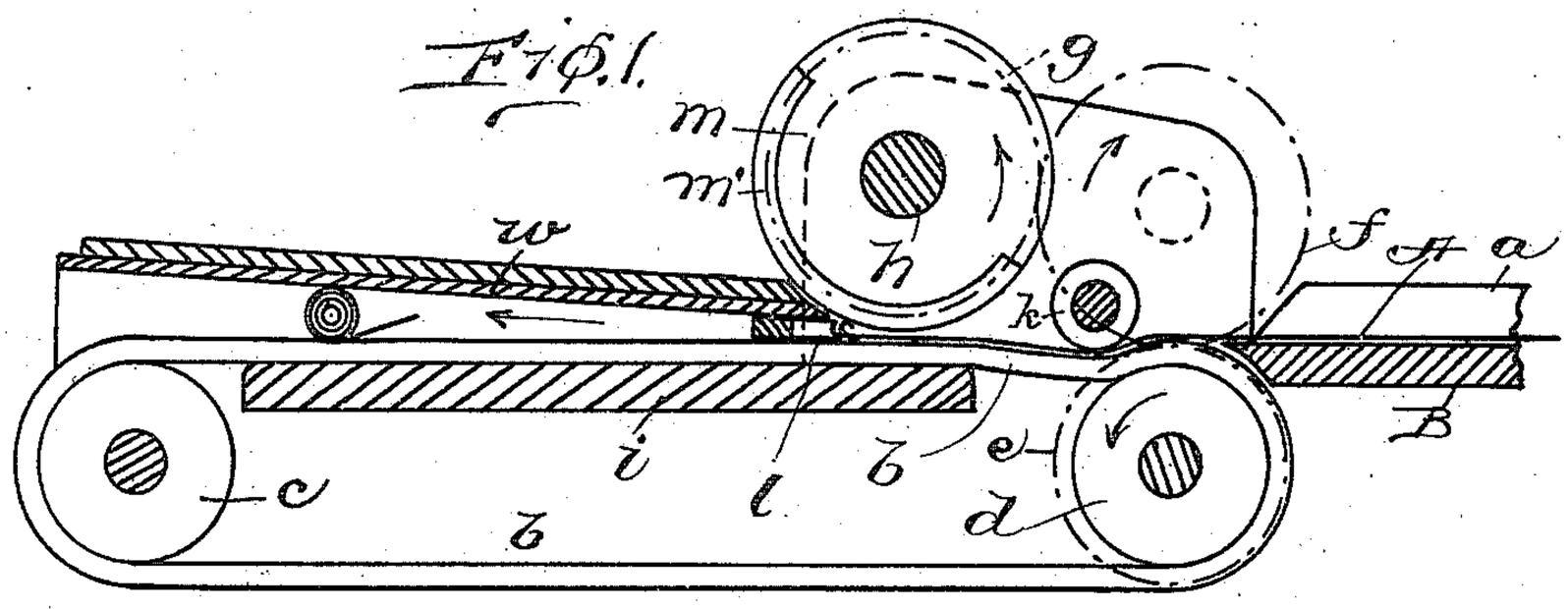



Fig. 2.

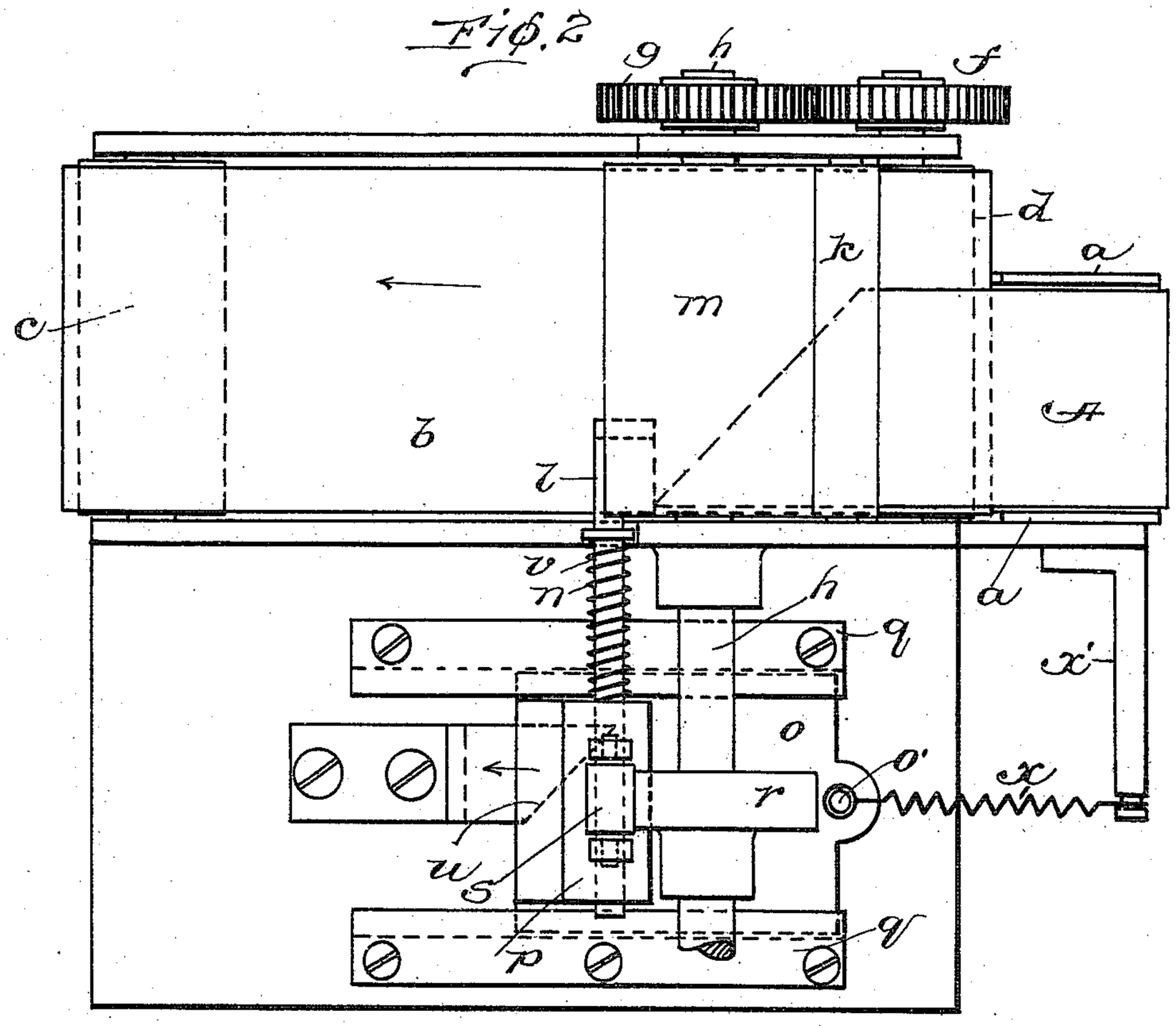
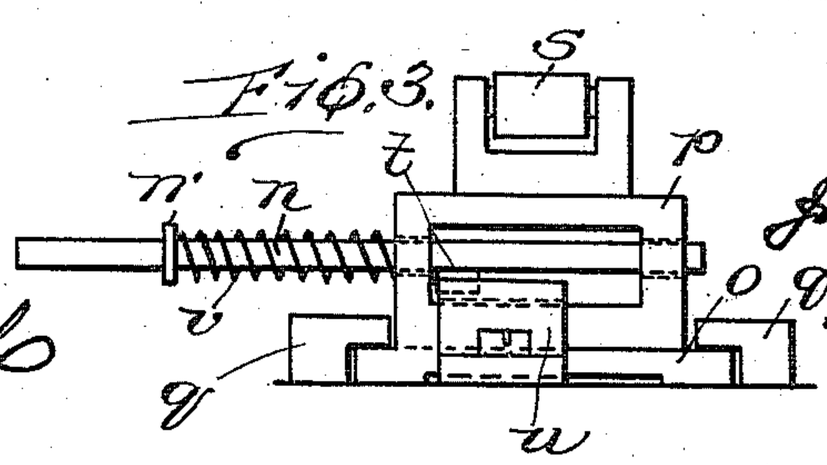



Fig. 3.

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2 SHEETS—SHEET 2.

Fig. 4.

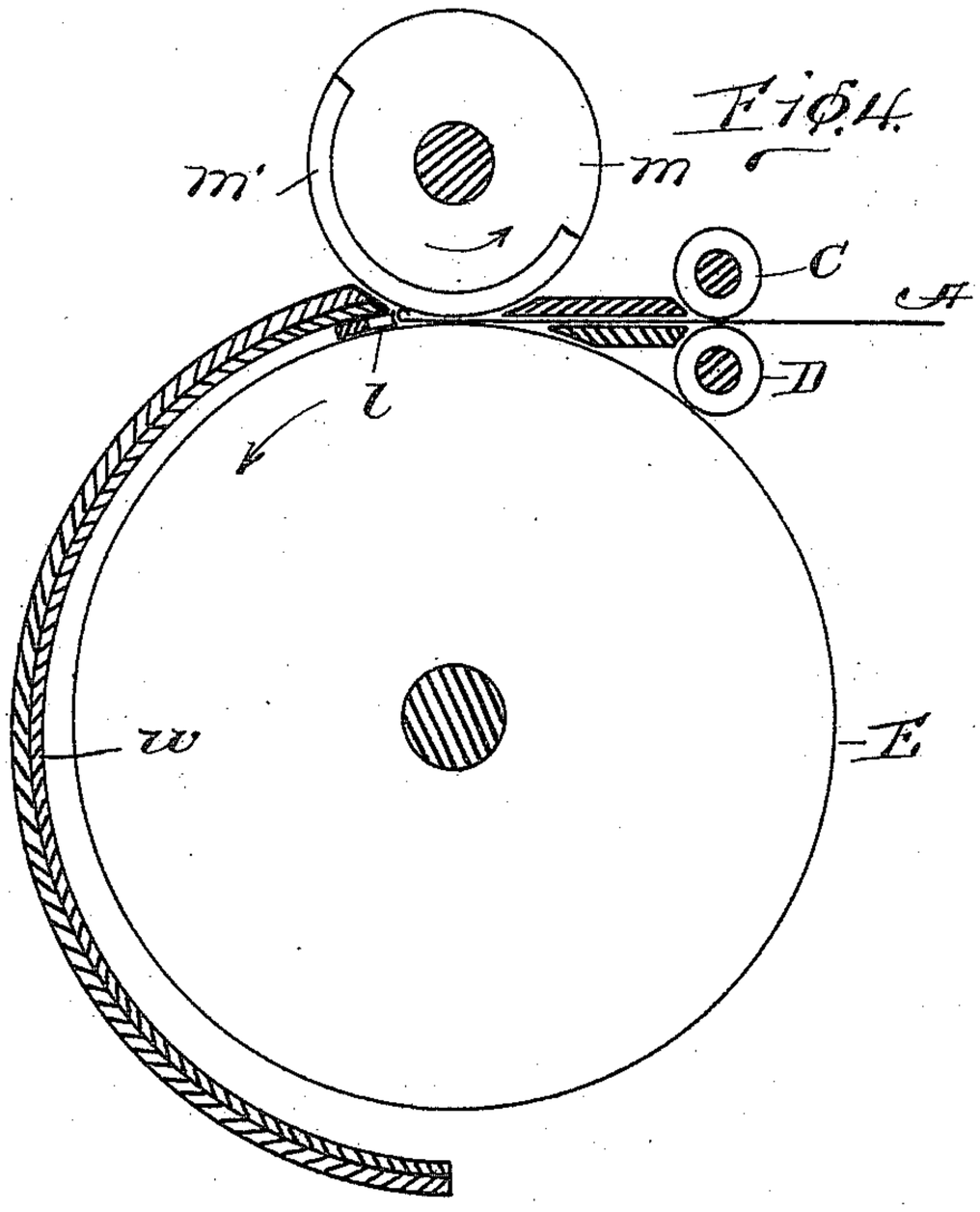



Fig. 5.

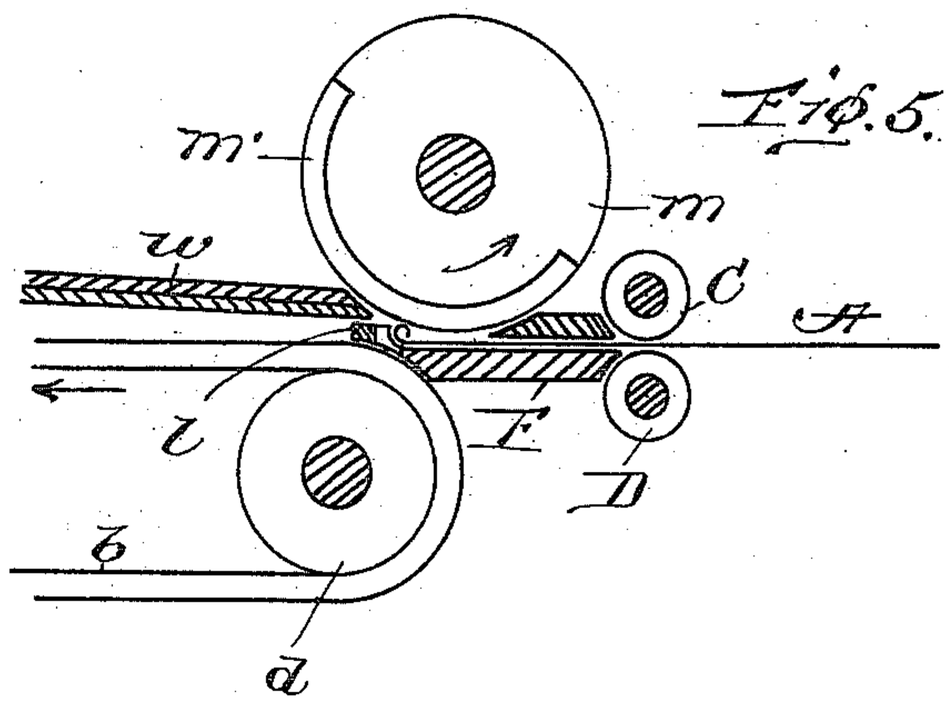
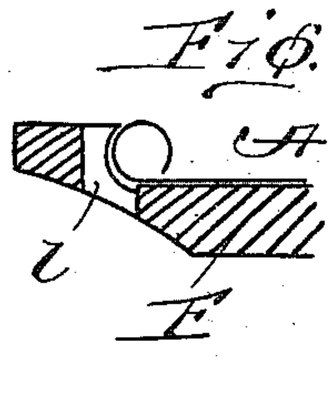



Fig. 6

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# UNITED STATES PATENT OFFICE.

JOHANN CARL MÜLLER, OF DRESDEN, GERMANY.

## PROCESS FOR MAKING MOUTHPIECE-TUBES.

985,365. Specification of Letters Patent. Patented Feb. 28, 1911.

Original application filed November 15, 1909, Serial No. 528,142. Divided and this application filed October 29, 1910. Serial No. 589,732.

*To all whom it may concern:*

Be it known that I, JOHANN CARL MÜLLER, citizen of the German Empire, residing at Dresden, Saxony, Germany, have invented certain new and useful Improvements in Processes for Making Mouthpiece-Tubes; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

The object of the present invention is to furnish a method whereby mouth piece tubes can be made more expeditiously than hitherto and, in case such tubes are made by machinery, with the intervention of simpler mechanism requiring a minimum of manipulation.

For this purpose my invention consists in a method by which the pointed end of an obliquely cut blank is first deflected out of the line of feed of said blank, while the blank is simultaneously fed forward, whereupon the said end is initially rolled up in a direction opposite that of the travel of the blank, after which deflection and initial rolling up, which steps I comprise under the term "curling the tip", the blank is carried forward bodily while causing the curled portion of the same to roll over a fixed surface.

This operation embodying my invention can be performed by various mechanisms, an essential feature, however, being that the acute angled corner or forward end of the mouth-piece blank first meets a deflecting gage in its path and then a moving surface which rolls it oppositely to the direction of travel of the blank, and that said deflecting gage at the proper period is withdrawn and the mouth-piece then is carried forward by a moving surface and held at the same time in contact with a fixed surface opposite thereto.

For purposes of a sufficient disclosure of my invention, I have represented in the accompanying drawing apparatus whereby my process may be carried out.

In the drawing—Figure 1 represents a vertical longitudinal section of one form of apparatus for the carrying out of my invention; Fig. 2 is a plan view thereof, the surface *w* having been omitted; Fig. 3 a detail in side elevation showing the means for operating the deflecting gage; Fig. 4 a vertical longitudinal section of a modified form of apparatus also adapted to the carrying out of my invention. Fig. 5 a similar view of still another form of apparatus; Fig. 6 a vertical sectional detail view thereof.

Referring to Figs. 1 to 3 it will be observed that B is a feeding table for the blanks having guide-flanges *a* to guide the strip of paper A as it is fed into the machine. The said paper blank A is of the form shown in Fig. 2, that is to say, it has parallel sides and is cut obliquely at its forward end.

In advance of the feed-table B is arranged the movable apron *b* which passes over the end rollers *c* and *d* and is caused by the roller *d* to travel in the direction of the arrow in Figs. 1 and 2. The said apron runs over and is separated by the bed *i*. Movement is imparted to the roller *d* and hence to the apron *b* in the direction of the arrow, by the driving shaft *h* upon which is keyed a gear-wheel *g* which meshes with the gear *f*, which in turn meshes with the gear *e*, fixed upon the shaft of the roller *d*. An idler *k* is mounted above and held in contact with the apron *b*, as shown best in Fig. 1. This idler *k*, in connection with the apron *b*, serves to feed the blank A forward, as will be understood.

In advance of the roller or idler *k* is arranged the deflecting gage *l*, which, as shown, is provided at its face opposite the idler *k* with a curved concave deflecting surface said concave surface facing toward the feeding end of the machine. Said deflecting gage, as shown in Fig. 2, extends only partially across and over the apron *b*, it being necessary only that it extend into the path of the forward pointed end of the blank A. This molding gage is provided with means for projecting it into the path of the blank A and withdrawing it from the same, such movement being timed in such a way that the gage will be in the path of the blank about the time that the corner of the same reaches the part of the apron onto which the gage is adapted to extend, and is held in such position until the forward corner has been rolled up sufficiently, whereupon it is withdrawn so as to permit of the continued forward motion of the blank.

The mechanism for so actuating the deflecting gage *l* is the following: The said gage is mounted upon a spindle *n*, said spin-

dle being provided with a collar $n'$. A bearing $p$ is secured to a slide $o$, guided in the guide-ways $q$, $q$, and in this bearing the spindle $n$ is adapted to slide transversely with respect to the apron $b$. A helical spring $v$ encircles the spindle and is held between the collar $n'$ and the bearing $p$ in such a way as to yieldingly urge the spindle and, with it, the deflecting gage forward, so as to occupy the position shown in the drawing over the apron $b$. In order to periodically withdraw the said spindle and the deflecting gage $l$ from this operative position, into a position away from said apron, the slide $o$ is arranged to be yieldingly urged in a longitudinal direction toward the feeding part of the machine by a spring $x$ attached to a bracket $x'$ mounted on a fixed portion of the machine and to the said slide $o$ at $o'$. On a fixed portion of the machine there is arranged an incline or cam surface $u$, (see Fig. 2) which incline bears against a lug $t$ fixed to the spindle $n$ and which is so arranged with respect to the same that when the slide $o$ moves toward the delivery end of the machine, the incline $u$, bearing against the lug $t$ causes the spindle and, with it, the deflecting gage $l$ to be withdrawn transversely out of the path of the blank A, as will be clear from an inspection of Figs. 2 and 3.

In order to move the slide $o$ in the direction of feed indicated by the arrow, and against the stress of spring $x$, so as to cause the incline or cam surface $u$ to engage the lug $t$ so as to withdraw the spindle $n$ and the deflecting gage $l$ away from the path of the blank A and against the stress of spring $v$, there is provided a cam disk $r$, Fig. 2, keyed to the shaft $h$, said cam disk $r$ being adapted to impinge against a friction roller $s$ journaled on standards rising from the slide $o$, as shown in Figs. 2 and 3.

Upon the shaft $h$ is mounted a roller $m$ which is covered on a portion of its periphery with a rubber mantle $m'$ which is adapted to come into contact with the forward corner of the blank as the same is being curled or started by the deflecting gage and which, therefore, serves in further curling or rolling said corner, the roller $m$, as will be noted, turning in the direction of the arrow thereon, that is to say, in a direction opposite to that of the movement of the apron $b$. As stated, said roller is only partially covered with the rubber mantle, the other portion of its periphery being so arranged that it will be out of frictional contact with the corner of the blank already rolled as the rubber mantle leaves the same.

The roller $m$, it will be noted, is arranged over the moving support and behind the deflecting gage $l$, that is between the latter and the feeding end of the machine.

To the rear of the roller $m$ is arranged the counter-surface $w$ consisting of a fixed plate slightly inclined with respect to the bed $i$ and the upper portion of the apron $b$. There is thereby formed a wedge-shaped space between which the blank A is carried forward by the apron $b$, the said blank being thereby rolled up, as shown in Fig. 1, by the combined action of the moving surface of the apron $h$ and the fixed surface of the counter surface $w$, as will be readily understood. Said counter surface, as shown, extends to the rear of the machine and substantially to the end of the apron $b$.

The operation will be clear from the foregoing. A blank A is introduced into the machine on the feed table B, is taken into the bite of the apron $b$ and the idler $k$ and carried forward until its forward point strikes the deflecting surface of the deflecting gage $l$, which is at this time in the path of the said blank. The forward corner of the blank is then curled and turned by the combined action of the deflecting surface and the curling roller $m$. When the front pointed portion of the blank A has been sufficiently rolled up, the deflecting gage $l$ is withdrawn transversely out of the path of the blank by the action of the cam surface $u$, impinging against the lug $t$ on the spindle $n$, the cam surface $r$ bearing against the roller $s$ and forcing the slide $o$ in the direction of the arrow, Fig. 2, against the stress of the spring $x$. The blank then passes forward into the wedge-shaped space between the apron $b$ and the counter-surface $w$ in which space it is completely rolled up and discharged from the machine after having passed the length of the apron $b$.

The deflecting gage being mounted on the reciprocating slide $o$ is caused to be moved forward to a slight extent in the direction of feed while being withdrawn and while the initial rolling operation is going on. Thereby the corner already rolled is more effectively introduced between the moving support and fixed counter-surface.

The operations may be timed in such a way that, after the first rolling of the corner of a blank has been performed a second blank is introduced into the machine, a third blank being completely rolled at the same time between the apron $b$ and the counter-surface $w$.

In Fig. 4 I have represented a somewhat modified form of device adapted to the carrying out of my invention. In this case means for feeding the paper strip or blank consists of the feed-rollers C and D which here take the place of the feed-table B. The movable support is in this case in the shape of a drum E instead of an endless apron as in Fig. 1. The deflecting gage $l$ and the curling roller $m$ are the same as in the first described construction. The counter-surface $w$, however, is in this case bent as shown, instead of straight as in Fig. 1.

In this case again the space between the movable support or drum E and the counter-surface *w* is wedge-shaped, that is to say, flaring forwardly toward the delivery end.

Still another form of machine for carrying out my invention is shown in Fig. 5, which differs from the first described form shown in Fig. 1 in that the deflecting gage *l* is arranged at the beginning of the endless apron *b* instead of being mounted at an intermediate point of the same, as in Fig. 1. Under this construction the paper strip, on undergoing its initial curling action, does not come into any contact whatever with the endless apron, the feed of the same into the machine being performed in this case as in the construction shown in Fig. 4, by the initial feed-rollers C and D arranged in advance of the table F at the delivery end of which the gage is mounted, as shown. The first rolling or curling of the forward end of the blank is here performed by the deflecting gage which turns up the said edge or point until it strikes against the roller *m* the frictional portion of which, *m'*, then coöperates with the said deflecting gage to curl up the said edge or point to impart to said blank the initial rolling up or curling. This arrangement will be in many cases sufficient to produce the necessary initial curling, but in general I prefer the arrangement under Figs. 1 and 4 whereby such initial curling is performed by the deflecting gage in coöperation with both the curling roller *m* and the movable support *b* or E, as the case may be. By this form of mechanism, when the first rolling of the paper strip is finished and the deflecting gage *l* is moved away, as under the construction of Figs. 1 and 2, the paper continues its movement by virtue of the rollers C and D and passes on to the endless apron or movable support *b* and between it and the counter-surface *w*, where the further operation is the same as under the first described construction. Under this construction it is preferable that the lower edge of the curved deflecting groove in the gage *l* does not lie above the edge of the table F, because, in that case, there would be a danger that the corner of the blank or paper strip would be bent in such a way that it could not be curled readily. For this reason, as shown in Fig. 6, the lower edge of the said groove is a little below the edge of the table F, although it would be sufficient if it were just flush with the same. Under all the forms shown in the drawing, the length of the gage transversely of the movable support is such that after the same has completed the curling action of the forward end of the paper blank the entire gage can be withdrawn from the apron in sufficient time to allow the initially curled blank to pass forward between the moving base and the counter-surface without interruption. In this way a continuous action of the machine is assured.

While the present invention relates to the making of paper tubes and particularly convolute wound mouth-piece tubes, it is to be understood that the same is applicable also to making tubes from other sheet material.

Reviewing the steps of my process, it will be noted that they consist essentially in first deflecting the pointed tip of an obliquely cut blank and then curling the same upon itself, to form a convolute, and then carrying the blank bodily forward and at the same time causing the curled portion of the same to roll over a fixed surface. This curling action may be carried out under my invention by the coöperation of the deflecting gage having the curved groove presented toward the blank and arranged in the path of said blank, with a curling roller such as *m* which moves in a direction opposite to the direction of the feed of the said blank, said parts, under what I consider the best construction, coöperating also with a movable bed such as a movable apron as *b*, Fig. 1, or drum as E, Fig. 4. The curling roller *m* having a frictional surface *m'*, although in most cases sufficing to curl up the front edge or point of the blank, is greatly aided by such movable support which carries the blank bodily forward. By having the roller *m* provided only partly with a frictional surface and partly with a non-frictional surface, I attain the valuable result that as soon as the blank has been initially curled and the gage *l* has been withdrawn from the path of the paper, the said paper is positively fed forward by the movable bed without interference from the roller *m* and without necessitating the lifting away of said roller as would be the case were the same covered entirely with a frictional surface.

It will be noted that the gage *l* first deflects the pointed tip of the blank out of the path or line of feed of the blank, whereupon it is engaged by the frictional surface *m'* and thereby rolled up in a direction opposite to the direction of travel, thus completing the curling operation. Thereupon the gage *l* is withdrawn out of the path of the blank and the blank is carried forward bodily by the apron *b* or drum E, while causing the initially curled portion to roll over the fixed surface *w*.

While I have herein shown and described apparatus for carrying out this process for purposes of a full disclosure, I do not herein claim the same, since the same has been claimed in my Letters Patent of the United States No. 977,394 dated November 29, 1910, granted on an application concurrently pending with this application.

I claim—

1. The method of making convolute

wound mouth-pieces which consists in first deflecting the forward end of a blank out of the line of feed of said blank, then rolling up said end in a direction opposite to the direction of feed, and finally rolling up the blank in the direction of feed.

2. The method of making convolute wound mouth-pieces, which consists in first curling the pointed tip of an obliquely cut blank upon itself and then carrying the blank bodily forward, while causing the curled portion of the same to roll over a fixed surface.

3. The method of making paper convolute wound mouth-pieces, which consists in first deflecting the pointed tip of an obliquely cut blank and then curling the same upon itself and finally carrying the blank bodily forward while causing the curled portion of the same to roll over a fixed surface.

4. The method of making convolute wound mouth-pieces which consists in first deflecting the pointed tip of an obliquely cut blank out of the line of feed of said blank, then rolling said tip up in a direction opposite to the direction of feed, and finally rolling up the blank in the direction of feed.

5. The method of making convolute-wound mouth-pieces, which consists in first deflecting the pointed tip of an obliquely cut blank out of the line of feed of said blank, then rolling said tip up in a direction opposite to the direction of feed, and finally carrying the blank bodily forward while causing the rolled up portion to roll over a fixed surface.

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

JOHANN CARL MÜLLER.

Witnesses:

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RICHARD TFFERSE.