decision is authority only to the extent of the case before it. The court does not appear to have decided that the county court could not levy a general tax for the expenses and liabilities of the county. It was only called upon to consider how far an extraordinary or special tax could be levied. The case called for nothing more; and, if more was intended by the judge who delivered the opinion, it was purely *obiter*. In the present case, as already said, there is no effort to enforce the levy of any special tax.

Upon the whole, therefore, we think the relator is entitled to the *mandamus* for which he prays.

Judgment reversed, with instructions to give judgment on the demurrer to the return against the respondents.

MR. CHIEF JUSTICE WAITE, with whom concurred MR. JUSTICE MILLER and MR. JUSTICE BRADLEY, dissenting.

I am unable to concur in this judgment. I think the act under which the bonds were issued limited the power of taxation for their payment, and that the holders are chargeable with notice of the limitation. The debt authorized was one payable from a particular fund. If the fund is deficient, the legislature alone has the power to grant the necessary relief.

WERNER *v.* KING.

1. Form, when of the essence of an invention, is necessarily material; and, if it be inseparable from the successful operation of the machine, the attainment of the same object by a machine different in form is not an infringement.
2. The use by Robert Werner, under letters-patent No. 134,621, for crimping and fluting-machines, issued to him Jan. 7, 1873, of the detent, or finger, in combination with fluting-rollers to produce crinkles or puffings, is not an infringement of the double-plated semi-cylinder guides covered by reissued letters-patent No. 3000, granted to George E. King June 23, 1868.

APPEAL from the Circuit Court of the United States for the Southern District of New York.

This was a bill in chancery by George E. King against Robert Werner for the alleged infringement by the latter of two reissued letters-patent, No. 3000 and No. 3001, granted to

the complainant June 23, 1868, the first being for an improvement in fluting-machines. The schedule referred to in the letters-patents therefor, and making part of them, is as follows: —

"*To all whom it may concern:*

"Be it known that I, George Edwin King, of the city, county, and State of New York, have invented certain new and useful improvements in fluting-machines; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, making a part of this specification, in which —

"Fig. 1 is a front elevation of a fluting-machine constructed according to my invention.

"Fig. 2 is an end elevation of the same.

"Fig. 3 is a detached section representing a portion of the same.

"Fig. 4 is a plan view of a piece of the fluted puffing for the manufacture of which my invention is intended.

"Similar letters of reference indicate corresponding parts in all the figures.

"This invention is designed for making puffing applicable to shirt-bosoms, trimming, or other purposes of dress, in which the article, as it issues from the machine, is (without having recourse to laundering) delivered in a complete form, either singly or in two or more series or rows, composed of flattened borders, with flutes running along their inner edges, and puffed or crinkled surfaces between the flutes.

"The invention consists in a guide constructed with one or more curved or arched portions, in combination with one or more suitable fluting-rollers, whereby the material, in passing through the machine, is fluted and contracted laterally, as it were, or drawn up between the flutes to produce the required crinkled surface or surfaces in the puffing.

"To enable others to understand the construction and operation of my invention, I will proceed to describe it with reference to the drawings.

"A represents the frame which supports the working parts of the apparatus, and situated longitudinally, in the upper part of which are two fluting-rollers, B and C, which are situated one above the other, with their ends projecting through large vertical slots, *a*, formed in the ends of the frame, A; the roller, B, being supported

in semicircular bearings formed in the lower ends of the slots, *a*, and furnished at one end with a crank, *b*, and the upper roller, C, working in semicircular bearings, *c*, formed in sliding-blocks, *c*, placed upon the ends thereof, and pressed down upon the same by a spring, *d*, the tension of which may be regulated by means of a vertical screw, *e*, situated centrally in the top of the frame, A.

"When desired, the upper roller, C, may be held within a given distance of the lower roller by vertical set-screws, *f*, situated one at each end of the top of the aforesaid frame, A, and acting upon the sliding or adjustable bearings, *c*.

"The puffing is represented in Fig. 4, and is formed of strips of any suitable fabric, and of a width, when finished, nearly or quite equal to the length of the fluting-rollers, B C, and is formed with longitudinal portions, *g*, which are fluted transversely to the length of the strip aforesaid; also with portions, *h*, in which the fabric is pressed flat, and through which longitudinal rows of stitching are formed, to render permanent the conformation of the puffing; and also with portions, *l*, which are intended to be wider than the parts just described, and which are puffed or crinkled in such manner as to possess an irregular wavy surface.

"In order to form these several portions of the puffing, each of the flutting-rollers, B C, is formed with as many annular or circumferential series, A′, of grooves and flutes as there are fluted portions, *g*, upon the puffing, with as many narrow annular faces, B′, as there are flattened portions, *h*, and with as many comparatively broad portions, C′, as there are puffed portions, *i*, in the finished puffing; each of the said parts of the rollers being of the same width as that portion of the completed puffing which it is designed to shape, and the circumferential faces or portions, C′, being of such diameter, that, when the two rollers are in proper position, those upon one roller will be situated at such distance from those upon the other that no considerable pressure will be exerted upon the fabric in passing between them and the several series, A′, of grooves and flutes upon one roller gearing into those upon the other roller.

"D indicates pressers, the rearmost end of each one of which is curved downward, and fitted upon the upper rearmost part of each of the faces, B′, of the lower roller, B, with its forward end curved upward in contact with the forward sides of the corresponding face, B′, upon the other roller, as shown in Figs. 2 and 3, the aforesaid rearmost ends of these pressers, D, being pressed against the roller, B, by set-screws, *j*, passing through a horizontal bar or brace, *k*, secured upon the rear of the frame, A.

"Fixed upon the forward side of the frame, A, in front of the roller, B, is a horizontal supporting-brace, *m*, which has fixed upon it an inclined plate, *n*, upon which is supported the inclined guide, E, which is composed of two pieces of sheet metal, secured one over the other, at such a distance apart as to permit the passage of the cloth or fabric between them; and those parts of this guide, E, in front of the plain cylindrical portions, C′, of the rollers, are curved upward or arched transversely, as shown at *a*′, in such manner that the width of the fabric passed between each pair of the plain portions, C′, will be greater, if stretched out to its full extent, than the width of the said portions, so that the said fabric, by means of its increased width, will be crinkled or puffed in passing between the aforesaid portions, C′, as will be presently fully set forth.

"The end of the strip of cloth or fabric from which the fluted puffing is to be formed is passed into and through the guide, E, and between the rollers, B C, and a rotary motion in the direction of the arrow, shown in Fig. 2, is communicated to said rollers by turning the crank *b*, or by other suitable means.

"The fabric is drawn lengthwise between the rollers, those portions thereof which pass between the several opposite series, A′, of grooves and flutes of the two rollers being fluted, as shown at *g*, in Fig. 4, while those portions of the said fabric which pass between the smooth, narrow annular faces, B′, of the rollers, being formed into gathers by the fluting of the fabric at the sides or edges thereof, are pressed flat by passing under the pressers, D, as the fabric is drawn along, at the same time that those portions of the fabric drawn through the curved or arched parts, *a*′, of the guide, E, being, if stretched to their full extent, of a width greater than that of the smooth cylindrical portions, C′, and being also gathered by the fluting formed at their sides or edges, are caused to assume a crinkled or puffed form, as they are passed between the aforesaid portions, C′, the distance between the opposite smooth portions, C′, aforesaid being such that no pressure is exerted upon the fabric passing between them beyond that required to simply press the convex surfaces thereof downward to a sufficient degree to insure the shaping thereof into the puffed condition just herein described.

"The extent to which the material will be thus contracted laterally, as it were, or drawn up between the flutes, will be governed by the excess in length of the arched portions, *a*′, of the guide over a straight line or lines connecting such arched portions at their base.

"By these means, the fluted puffing is brought into the form required in the finished article without the necessity of washing the same, in order to bring the puffing into such form.

"To complete the puffing, longitudinal rows of stitching are formed in the flat parts, *h*, of the puffing, to retain it in shape; and, when desired, the puffing as thus completed may be divided longitudinally in the said parts, *h*, to separate it into narrow pieces, as required for various trimming purposes.

"What I claim as new, and desire to secure by letters-patent, is —

"The guide, E, constructed with one or more curved or arched portions, *a'*, in combination with suitable fluting-rollers, substantially as herein set forth, for the purpose specified."

The drawings referred to in the foregoing specification are as follows: —

Fig. 1.

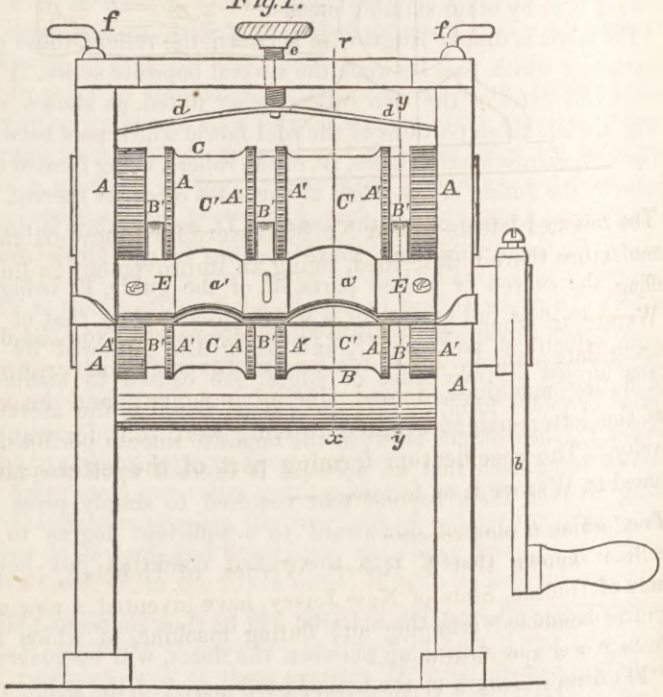


Fig. 2.

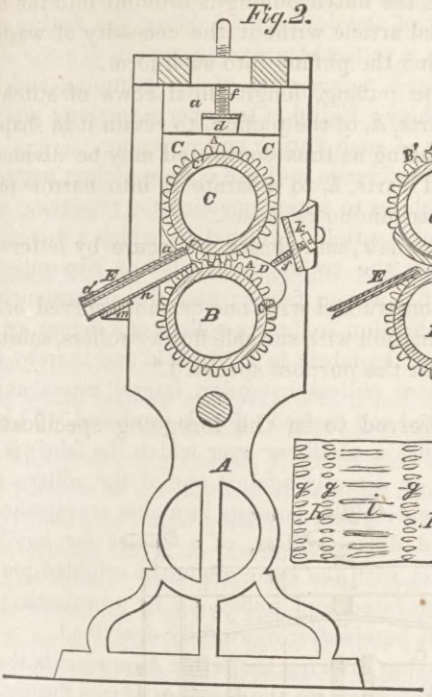


Fig. 3.

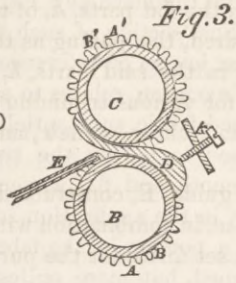
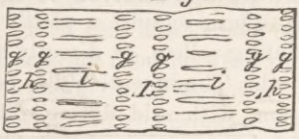


Fig. 4.



The reissued letters-patent No. 3001 were for a new article of manufacture therein described, being an improvement in fluted puffing.

Werner, to whom were granted letters-patent No. 134,621, bearing date Jan. 7, 1873, for an improvement in crimping and fluting machines, denied the infringement, and insisted that the letters-patent granted to King were void, for want of novelty. The specification forming part of the letters-patent granted to Werner is as follows: —

"*To all whom it may concern:*

"Be it known that I, Robert Werner, of Hoboken, in the county of Hudson, State of New Jersey, have invented a new and improved combined crimping and fluting machine, of which the following is a specification: —

"Fig. 1 represents a vertical transverse section of my improved crimping and fluting machine, the line, *c c*, Fig. 2, indicating the

plane of section. Fig. 2 is a plan or top view of the same. Fig. 3 is a perspective view of the device for holding the fluting against the rollers. Fig. 4 is a vertical transverse section of a modification of my invention; Fig. 5, a face-view of the crimping and fluting produced on the machine; Fig. 6, a transverse section; and Fig. 7, a longitudinal section of such fluting and crimping.

"Similar letters of reference indicate corresponding parts.

"This invention relates to a new machine for producing a fluted and crimped fabric, substantially like that for which a design patent was granted to me on the twenty-ninth day of November, 1870, from a smooth and flat woven fabric; and the invention consists principally in the application to fluting-rollers of a detent, or finger, by which a portion of the fabric is held back, and thereby formed into V-shaped, but more or less irregular, lateral waves and crinkles, whereby the stated and desired effect is produced. This finger is made to bear against a platform over which the fabric is passed to the fluting-rollers, or directly against one of the rollers, as may be desired. The invention also consists in a new arrangement and connection, with said fluting-rollers, of a device for holding the fluted fabric in contact with the same while the crinkled portion of the fabric is being elevated and puffed up by a projecting rib or stationary plate, all as hereinafter more fully described.

"In the accompanying drawing the letter A represents the frame of the machine. In the same are the bearings of two fluting-rollers, B B, which are parallel with each other, and, by preference, in a horizontal position, as indicated. The rollers, B, are provided with zones, *a a*, of fluting or toothed portions, which will cause certain strips of the fabric which pass between the said rollers to be fluted, while the remaining portions of the same fabric will not be fluted. C is a platform secured to the framework, A, in front of and about in line with the space between the two rollers. D is a detent or spring fastened to a bar, *b*, which rests by posts, *d*, upon the platform, C. The free end of the spring, D, bears against said platform midway between the two inner zones, or any pair of zones, *a a*, on said rollers. The fabric is passed over the platform, C, before it enters the rollers, or rather in its passage to the said rollers, and is consequently passed under and subjected to the pressure of the spring, D, being fed or drawn forward by and between the rollers. That portion of the fabric which is subjected to the pressure of the spring, D, will be detained or held back or stretched back to be drawn into the V-shaped crinkles or crimping, which is indicated

in Fig. 5, at *e*. This effect, of course, can only be produced if the detent, D, bears upon the fabric previous to its being acted upon by the rollers, so that the portion affected by said spring can be drawn back by the detent in the manner shown. The same effect can be produced by the modified form of detent shown in Fig. 4, in which case the said detent is made to bear against one of the rollers, B, and fastened to the under side of a plate, C. This modification can only be used when the detent bears against the rollers so far forward of the line that connects the two axes of the two rollers that sufficient material will be at the command of the detent to draw the fabric back into the V-shaped crimping; for, if the detent would apply to the middle of the roller when the fluting has already hold of the fabric, the drawing back could not be produced, inasmuch as the fluting would take up all the surplus fabric, and none would be left for the effect by the detent. E E are metallic plates or bars provided with projecting cheeks, *f*, which said cheeks bear against the fluted portions of the fabric as it emerges from between the two rollers, and hold said fluted portion in contact with the lower roller, while a projecting rib, *g*, moves the centre of the crinkled portion from off said roller. This gives the transverse wave of the fabric which is indicated in Fig. 6. The plates or bars, E E, can, by set-screws, *h h*, be adjusted nearer to or further away from the fluted portions of the rollers for the purpose of holding the fluted portion of the fabric more or less firmly against the rollers, and for flattening portions of the fluting between the zones, *a*. The rollers may be made to be hollow, to be heated by steam or otherwise, so that the fabric which is passed between them — preferably in a moist state — may retain the form into which it is put by the action of the machine. It will be found convenient to raise the detent, D, off the platform, C (or withdraw it from contact with the roller, B, when placed as in Fig. 4), in order to enter the end of the fabric between the rollers. With this object, the bar, *b*, is made detachable, and locked by keys, *l l* (or the plate C made to be drawn back and forward).

"Having thus described my invention, I claim as new, and desire to secure by letters-patent, —

"1. The detent, D, arranged in combination with the fluting-rollers, B B, to produce the crinkles or puffing on the fabric, which is partially fluted, as set forth.

"2. The platform C, or C′, arranged in combination with the detent, D, and rollers, B, as specified.

"3. The cheek-pieces, *f*, in the plates, E, applied, in conjunction with the projecting rib, *g*, to the fluting-rollers, B B, as specified."

Fig. 1.

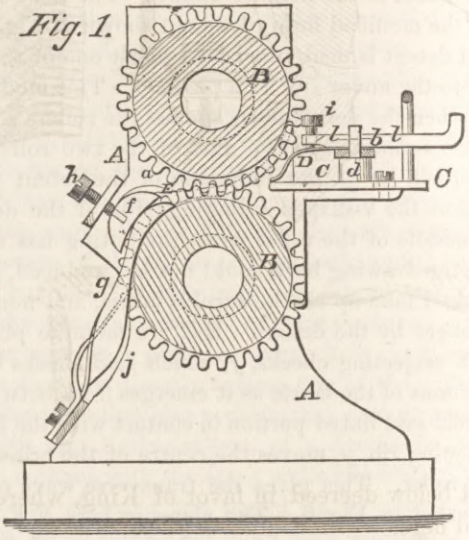
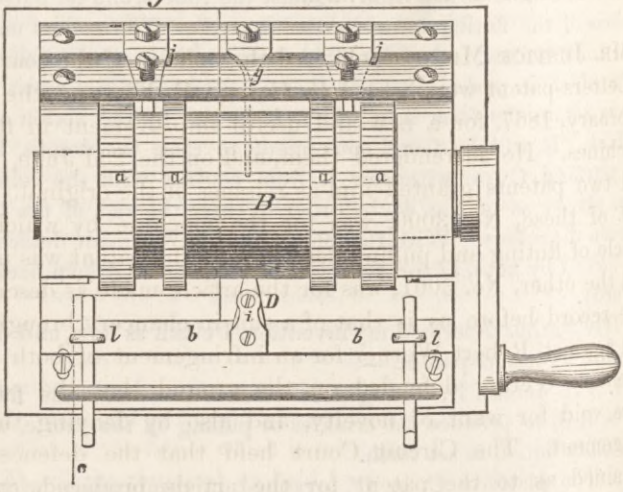
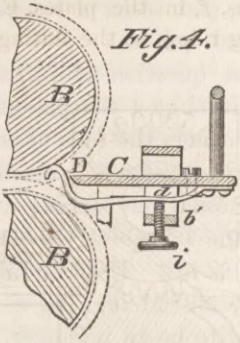
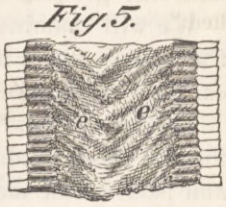
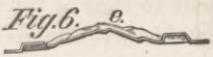


Fig. 2.









The court below decreed in favor of King, whereupon Werner appealed here.

Mr. Arthur v. Briesen for the appellant.
Mr. Frederic H. Betts, contra.

MR. JUSTICE MILLER delivered the opinion of the court.

Letters-patent were issued to George E. King on the 26th February, 1867, for a new and useful improvement in fluting machines. He surrendered them, and on the 23d June, 1868, had two patents granted him as reissues of the original. The first of these, No. 3000, was for the machine by which the article of fluting and puffing described in the patent was made; and the other, No. 3001, was for the article made as described. The record before us is that of a suit in chancery brought by him against Robert Werner for an infringement of both these patents. Werner defended on the ground that the patents were void for want of novelty, and also by denying the infringement. The Circuit Court held that the defence was sustained as to the patent for the article produced, on the ground that it was not new, but rendered a decree in favor of King as to the reissued patent, No. 3000, for the machine.

Werner alone appeals, and seeks a reversal of the decree on both the grounds urged below.

We will examine the question of infringement first; for, if the appellant has not infringed the patent of the appellee, he can very well leave to others the task of contesting its validity.

The appellant is also patentee of a machine for crimping and fluting, which produces an article similar to that of the appellee, and parts of the machine by which the purpose is effected are substantially the same as his. If on looking at the machine in detail there is such substantial identity as to all its parts, the appellant must be held to be an infringer, for his patent bears a date more than four years subsequent to that of the appellee.

The appellee's schedule declares that his invention is designed for making puffing applicable to shirt-bosoms, trimming, or other purposes of dress, in which the article, as it issues from the machine, is (without having recourse to laundering) delivered in a complete form, either singly, or in two or more series or rows, composed of flattened borders with flutes running along their inner edges, and puffed or wrinkled surfaces between the flutes.

The fabric to be fluted and puffed is drawn between a pair of rollers moved by a crank, the rollers, where they approach each other, having flutes or grooves so arranged as by their pressure on the fabric as it passes between them to make the fluting and to flatten it. These grooves on the rollers, while they are continuous in the annular or circumferential direction of the rollers, are interrupted in their longitudinal direction by smooth spaces, so that the material passing between the rollers is fluted or crimped in parts of its width and left plain in other parts which do not pass over the grooves. It is obvious, if this plain portion of the fabric, as it passes over the plain surface of the roller, can be so presented as to be compressed laterally, or in any other manner to have more of the material thus forced into the machine than is necessary to cover this plain surface, that when it comes out of the machine, while the fluted parts are fixed and flattened, the intermediate portion must present a puffed and irregular surface. It is this effect which is desired, and which King, by an additional contrivance, produces; and it is this contrivance which, in combination with the fluting-rollers

already described, but which are not new, he claims as his invention.

This part of the machine consists of a double-plated segment of a hollow cylinder, the arch of which is upwards, so arranged with regard to the fluting-rollers that the part of the material which is intended to be puffed and not fluted, passing first between the plates of this arched guide, is presented to the plain surface of the roller, with the width of the strip increased by the difference between the lines of the curved or arched surface of the cylinder and the plain or horizontal surface of the roller which receives it. The result is, that when the material comes out of the machine this redundancy of the plain part of it assumes the form of irregular puffs, which is the end to be attained. All this is very well described, and specific references illustrated by drawings are given to the various parts of the machine.

"What I claim as new," he says, in conclusion, "and desire to secure by letters-patent, is: the guide, E, constructed with one or more curved or arched portions, *a*, in combination with suitable fluting-rollers, substantially as herein set forth for the purpose specified."

The schedule of Werner's patent, which is numbered 134,621, describes the same kind of fluting-rollers, and is designed to produce, while passing through them, what he calls a crinkled surface in that part of the fabric not fluted. But in his machine the redundancy of material is produced by passing it over a smooth, flat surface, from which it is presented to the fluting-rollers; and while so passing over this flat surface a detent, or finger, is applied to that part of it not to be fluted, which, by reason of the pressure of a spring, holds back this part of the material. It is thus formed into V-shaped waves or crinkles, more or less irregular, whereby the desired effect is produced.

It will be observed that the main features of both machines are the same, and that whatever is new in either is ingrafted upon a fluting-machine, many of which were patented long prior to both of them.

The question we are now to consider is, whether the flat surface and finger, or detent, of Werner are the mechanical

equivalents of the double-plated segment of a cylinder used by King, within the principles of the patent law on that subject.

It is said that they are equivalents, because they produce the same result. The fact stated may be doubted; for an examination of numerous pieces of textile fabrics passed through both machines show in those crimped by Werner's the regular V-shaped crinkle, with the acute angle pointing in the same direction with great uniformity; while in those passed through King's the puffs are elevated, wavy, and irregular. But since the patent for the article is not contested here, this difference is of no other importance than as it illustrates the difference in the mode of operation of the two machines.

It is further said, that the difference is merely one of form; and cases are cited in which this court has held that a mere variation in the form or shape of the instrument cannot be successfully used to evade the monopoly. But where form is of the essence of the invention, it is necessarily material; and, if the same object can be attained by a machine different in form where that form is inseparable from the successful operation of the instrument, there is no infringement. *Winans* v. *Denmead*, 15 How. 330. In King's patent, the result sought is wholly due to the guiding arch, through which the fabric is carried. It is this semicircular form which gives the redundancy of material necessary to the puff; and no guide which did not in some manner give the material an arched or curved shape as it passed into the fluting-rollers can be considered as a part of King's patent. It is not only necessary to an infringement that the arrangement which infringes should perform the same service, or produce the same effect, but, as Mr. Justice Nelson said in *Sickles* v. *Borden* (3 Blatchf. 535), it must be done in substantially the same way. *Burr* v. *Duryee*, 1 Wall. 531.

The difference in the shape or form of the guide in these machines is not the only one. They operate on entirely different principles. King's instrument is, to some extent, automatic.

The strip of the fabric to be used, being once between the upper and under plates of his arched guide, cannot escape, and it must, in passing into the fluting-rollers, present the same amount of redundant material, whatever may be the elasticity

or rigidity of the fabric. A piece of leather would, if it passed through, present precisely the same elevation of the arch, and length of line of the semicircles, as a piece of gauze. Whereas, under the operation of the detent of Werner, the length of the lines and the acuteness of the angle of the V would vary with the resisting strength of the fabric and the power of the spring which pressed the detaining finger.

Another marked difference is, that in King's machine the redundant fulness which makes the puff is produced by a pressure which is uniform over the surface of the fabric, the two plates giving it the exact form required, and no other; while Werner's finger seizes the fabric in the centre of the part to be crinkled, and by pulling on it at this central point, as it is dragged in between the rollers, enough of the material is drawn in from the edges towards the centre to create the redundancy necessary to the puff or crinkle. This is done by the material passing over a flat, smooth surface; and while on this flat plate the finger is applied to it, and detains or draws to this central point a portion of the fabric. There exists no such plate or flat surface or finger in King's machine. It seems impossible to hold that this flat surface, this pointed finger whose force is dependent on a spring, are the mechanical equivalents of the double-plated semi-cylinder of King's guide. If this be so, it is because King's patent covers every method which can be invented for presenting the material to the fluting-rollers in such a manner as to create a redundancy to be made into puffs. This is not claimed; and, if claimed, the claim would be fatal to the patent.

We are of opinion that the machine of Werner, and its use by him, is no infringement of King's, and the decision of the Circuit Court will, therefore, be reversed, and the case remanded with directions to dismiss the bill; and it is

So ordered.