state of preparation as to be fit for use as starch, it should pay the duty required by paragraph 323. He adds:

"While the testimony is not altogether clear upon that precise point, I am unwilling, upon the record as it stands, to disturb the finding of the board that the article imported here is fit for use as starch; and, that being so, the conclusion follows that it is dutiable under paragraph 323."

The decision of the appeal turns upon the question whether, under the testimony, tapioca flour can be considered as a preparation fit for use as starch. The article has never been sold as a starch, and is not considered in this country as adapted to the ordinary purposes of that article, and has never been manufactured into commercial starch, but it is chemically a starch.

The term, "preparations fit for use as starch," means preparations which are actually and not theoretically fit for such use, which can be practically used as such, and not which can be made by manufacture fit for such use. Tapioca flour is used for purposes which are analogous to those for which starch is used. It is not used, though it probably could, by adequate preparation, be used, for the same purposes, unless its use as a sizing can be called the same purpose. The testimony of the witness upon that subject was not sufficient to justify the stress which the board of general appraisers placed upon it. The very suggestive evidence of the unsuitableness of tapioca for commercial use as starch is that, although it is much cheaper than starch made in this country, it does not come into commercial competition with starch made here.

The appellants make the point that the language of the free list exempts from duty the articles specified therein, "unless otherwise specially provided for in this act," and that tapioca is not specially provided for except in the free list. If tapioca flour was, in our opinion, a preparation fit for use as starch, the question would have arisen whether it was specially provided for under paragraph 323; but, the conclusion being that it was not such a preparation, it has a place only in the free list.

The judgment of the circuit court is reversed.

NEW YORK PAPER-BAG MACH. & MANUF'G CO. v. HOLLINGSWORTH & WHITNEY CO.

(Circuit Court of Appeals, First Circuit. April 28, 1893.)

No. 11.

1. PATENTS FOR INVENTIONS—LIMITATION OF CLAIMS—PAPER-BAG MACHINES.
Letters patent No. 337,965, issued March 16, 1886, to Lorenz & Honiss, for an improvement in machines for making bags from a tucked paper tube, and relating more particularly to the mechanism for opening the bottom of the bag into the "diamond fold," do not cover a pioneer invention, and the novel feature of the patent is embraced in the fingers which enter the inside of the bottom of the tube beneath the upper ply, and, turning over in an arc of 180 degrees, open the mouth, and form the diagonal fold.

2. SAME—INFRINGEMENT.
The first claim of the patent, which covers these fingers and their operation in the combination, is not infringed by the use of a machine made according to the Stilwell patent of December 17, 1889, in which the fingers have no rotary motion in common with the fingers of the Lorenz & Honiss patent, and have nothing to do with the formation of the rear fold of the diamond, which is accomplished by other instrumentalities after the fingers have raised the corners of the upper ply to a level with its center. 48 Fed. Rep. 562, affirmed.

3. SAME.
The second claim of the patent, which covers the combination of a reciprocating carriage, presser plate, side grippers, and front grippers, is not infringed by the Stilwell machine, for the lower feed roll of the latter is not the equivalent of the reciprocating carriage, and does not perform the function thereof.

Appeal from the Circuit Court of the United States for the District of Massachusetts.

This was a suit in equity by the New York Paper-Bag Machine & Manufacturing Company against the Hollingsworth & Whitney Company for the alleged infringement of a patent. There was a decree for defendant, (48 Fed. Rep. 562,) and complainant appeals. Affirmed.

Frederic H. Betts and Charles E. Mitchell, (Albert H. Walker, of counsel,) for appellant.

Francis T. Chambers and George Harding, for appellee.

Before COLT and PUTNAM, Circuit Judges, and WEBB, District Judge.

COLT, Circuit Judge. The plaintiff is the owner of letters patent No. 337,965, dated March 16, 1886, granted to William A. Lorenz and William H. Honiss, assignors to Felix W. Leinbach, and Clarence A. Wolle, for improvements in paper-bag machines. Machines for making plain satchel-bottom paper bags from a continuous paper tube without tucks have existed for many years. The patent in suit relates to a machine for making paper bags from a continuous tucked paper tube, and it particularly concerns that part of the mechanism which opens the bottom of the bag into what is called the "diamond fold." The first mechanism which acts upon the tube is two feed Rolls, which cut the tube into a bag blank, and deliver it to a flat table. This table moves on horizontal slides, and has a reciprocating motion towards and away from the feed rolls. Fastened upon the table are a presser plate, two side grippers, and a front gripper. The presser plate is lifted slightly above the table, and then presses down upon it. The grippers are at times thrown away from the table and at times press upon it. The remaining device consists of two fingers, which move forward and backward with the reciprocating table, and swing through an arc of nearly 180 degrees around a line which corresponds to the front edge of the presser plate. These fingers are pivoted, and attached to the rear ends is a spring which holds those ends together, and opens the front ends at an angle of 90 degrees.

As the blank is fed forward between the feed rolls, the reciprocating table moves backward, the presser plate and grippers rise

from the table, and the fingers are thrown forward. This action continues until the blank has been delivered to the table, when the presser plate and grippers come down and clamp it to the table. The side grippers seize the lower fold at the sides of the blank, and the front gripper seizes the lower ply of the blank. As the table moves forward the fingers enter the inside of the blank beneath the upper ply, and move upward and backward, describing an arc of nearly 180 degrees, and thus turn over the blank upon itself against the forward edge of the presser plate. At the end of this movement the diamond fold is completed. The rear end of the diamond fold is formed by the bending of the paper around the two fingers, the front end by the strain of the paper between the two side grippers and the front gripper, and the side folds are defined between the side grippers and the points of the fingers. As the blank is withdrawn from the table, the fingers collapse by the resistance of the sides of the paper in the rear diamond fold which incloses them. This collapse is made against the pressure of the spring which holds together their rear ends, so that when they are entirely withdrawn from the blank their points will be at once separated again by spring action.

To understand the scope of this invention it is necessary to look at the state of the art as it existed at the time. In the prior Leinbach, Wolle & Brunner paper-bag machine patent of June 7, 1881, No. 242,661, we find two feed rolls, bed, presser plate, and side and front grippers. In that machine the bottom of the bag is opened and the front diamond fold defined by folding wings operating upon the outside of the blank in connection with the front gripper and presser plate. The front gripper is in the form of a finger, which presses down upon the lower ply of the blank. As the bottom of the bag is opened, this finger moves forward into the inside of the blank, and in connection with the movement of the presser plate completes the diamond fold. A second patent to the same parties, dated September 29, 1885, No. 327,280, describes a machine similar in most of its parts to the last. In both of these machines the table is stationary.

A patent granted to Lorenz & Honiss December 1, 1885, is for a machine resembling these last two, except that the table is reciprocating. In another patent of January 5, 1886, to Lorenz & Honiss, there is found a series of folding tables secured to the periphery of a revolving drum. These tables are each provided with grippers, wing folders, and a gripping finger which corresponds to the presser plate in the earlier machines.

Thus we find that at the date of the patent in suit feed rolls, stationary, reciprocating, and revolving tables, presser plates, side and front grippers, were well known in the art of making paper bags from a tucked paper tube.

By this reference to the prior art it appears that the novel feature of the patent in suit is the fingers which enter the inside of the bottom of the bag beneath the upper ply, and, turning over in an arc of 180 degrees, open the mouth and form the diamond fold. In prior machines the diamond fold was made by two distinct oper-

ations. The first consisted in opening the bottom of the bag into a box shape by the employment of side wings or folders upon the outside of the blank which revolved through an arc of 180 degrees, and then the diamond fold was formed by the use of other instrumentalities, such as rods or fingers coacting with the presser plate. In the patent in suit the use of these folding wings is done away with, and the bottom of the bag opened and the diamond fold defined by one operation of the backward sweeping fingers.

It is not to be denied that this is an ingenious and comparatively simple mechanism, and shows invention, but whether it can be embodied in a practical commercial machine may be questioned. No machine having this improvement was ever constructed except for the purposes of this suit. Owing to the strain upon the rear diamond fold caused by the pressure of the fingers as they are withdrawn, the blank is liable to be torn unless the paper is thicker than that ordinarily used. It may also be questioned whether the open fingers will at all times enter the bottom of the blank at the corners of the upper ply when the machine is working rapidly by power unless the blank is differently constructed from the one in general use, or the machine as described in the patent is modified.

Assuming, however, the machine to be practically operative, it is only for an improvement on prior machines. In the prior Leinbach, Wolle & Brunner patent of 1881 we find a single finger, which enters the mouth of the bag blank, and helps to define the diamond fold. It is true that the patent in suit describes mechanism which to a greater degree than ever before operates upon the inside instead of the outside of the blank in the formation of the diamond fold, as, for example, the fingers working from the inside do away with the use of the old side wings or folders which opened the bottom of the bag from the outside. But this change at most is only an improvement on the old machines.

An analysis of this patent in the light of the prior art, taken in connection with the circumstance that no practical commercial machine containing this invention has ever been put into use, forbids us from holding that this is a pioneer patent which marks a great advance in the art, or lies at the basis of a new art.

The question in this case relates solely to infringement. The defendant's machine, so far as the present controversy is concerned, is shown substantially in the patent granted to Charles B. Stilwell, December 17, 1889, No. 417,346. It consists of a pair of feed rolls, through which the tucked paper tube is fed to the mechanism which opens the bag and forms the diamond fold. As the blank passes between these feed rolls, the front edge of the lower ply is centrally gripped and carried downward by a finger upon the lower feed roll. The upper ply at the same time is fed forward almost in a horizontal plane until it passes over a narrow roll, between which and another roll above it is drawn forward. As the blank is fed along, the front gripper lets go, and at the same time two side grippers on the lower feed roll clasp the lower ply at the lower corners of the bag bottom. By the strain created between the side grippers

pressing upon the lower ply and the narrow roll and the roll above it pressing upon the upper ply the bottom of the bag is opened into a box-shaped form, with the exception of the two corners of the upper ply, which hang down below where it is centrally gripped between the rolls. It is at this point that the fingers in the defendant's machine begin to operate. These fingers are pivoted, and when they enter the bottom of the blank are held nearly together by spring pressure. Against this spring pressure, by the action of cams, they move in an upward curve until they reach the sides of the upper ply. These sides they press outward, and then, moving a short distance in an upward and vertical path, they press against the surface of the upper roll, thus carrying up the corners of the upper ply to the same plane in which its center is held, and so define the upper corners of the bottom of the bag. When the fingers have performed this function they begin to collapse, and cease to operate, and the blank passes downward and beyond their reach.

The tucker or presser plate in the defendant's machine moves in a vertical direction between the front of the feed rolls and the two forward rolls, and first comes in contact with the blank when the open bottom is held between the side grippers and the forward rolls. This indicates the forward line on the blank where the presser plate first touches it. As the presser plate descends it comes in contact with the blank at a point back of the first line. As the presser plate in its further descent moves faster than the feed roll, it now moves forward on the blank, and defines a third line between the other two, which is the creasing line of the ultimate diamond fold. The presser plate, still descending, carries the blank down to two folding wings. These wings fold inward against the pressure plate, and by their action in connection with two lower feed rolls which grip the lower ply define and complete the diamond fold.

There is another device in the defendant's machine which does not seem to us material to this controversy. This consists of a narrow plate, which lies in front of the lower feed roll. The main function of this plate seems to be to guide the end of the lower ply, and present it properly to the lower feed rolls. The machine is operative without the presence of this plate. Owing to the peculiar shape of the ends of the plies in defendant's blank this device is useful when the machine is driven rapidly by power.

From this comparison between the plaintiff's and defendant's machines, it appears that there is a wide difference in their construction and operation. The defendant's machine is organized more upon the principle of the older machines, inasmuch as the diamond fold is made by two operations. Like the old machines, the bottom of the bag is first opened into a box form, and then the diamond fold defined by a new set of instrumentalities, while in the plaintiff's machine the bottom of the bag is opened into the diamond fold by a single movement of the sweeping fingers.

The first claim of the patent is for "the combination of the fingers, 96 and 96'; with the spring, 103, all constructed and operat-

ing together substantially as described," and the principal question in this case is whether the defendant's machine contains this mechanism. In the plaintiff's machine the spring acts to keep the outer or the working ends of the fingers apart and their butt ends together, and their working ends are separated to their full extent when they enter the mouth of the bag. In the defendant's machine the springs draw the working ends of the fingers together to a position where they cannot engage with the blank as they enter it. The plaintiff's fingers are so separated that they will lie within the blank when the diamond is formed over them, and they collapse by the pressure of the paper on their sides as they are withdrawn from the rear diamond fold. The defendant's fingers, not having their butt ends together, are utterly incapable of lying within the diamond fold. The mode of action of the plaintiff's fingers is described in the patent as follows:

"They turn it [the bag blank] over upon itself against the edge of the presser plate, 51, while they also define the diagonal creases upon which the rear end of the diamond is folded down."

The defendant's fingers do not turn over the upper ply upon itself. They have nothing to do with the formation of the rear folds of the diamond, but this is accomplished by other instrumentalities. The plaintiff's fingers rotate in an arc of 180 degrees around a line corresponding with the edge of the pressure plate, and lie in a plane which always passes through that line. The defendant's fingers have a very slight rotary motion in an opposite direction to that in which the plaintiff's fingers revolve, and this movement at the time they act upon the blank is in an arc, convex to the edge of the tucker. There is no movement of the defendant's fingers which is common to the fingers of the plaintiff's machine. The cams which move the defendant's fingers might be said to be the equivalent of the plaintiff's spring if the fingers performed the same function, but not otherwise. The sole action of the defendant's fingers is to raise the corners of the upper ply to a level with its center, and to define those points, and then their operation ceases. The plaintiff's fingers enter the mouth of the bag, and, sweeping over an arc of half a circle, make the diamond fold.

The contention of the plaintiff that the defendant's fingers in their upward movement turn the upper ply over against the tucker or presser plate is true only in a slight degree, and is not true in the sense in which the plaintiff's fingers turn the edge of the blank. At the point where the defendant's fingers cease to operate, a slight bend only has been effected in the upper ply by the downward motion of the tucker, and the real folding over of the ply upon itself is effected by other mechanism after the fingers have retreated to their original position.

The second claim of the patent in suit is for "the combination of the reciprocating carriage, 38, the presser plate, 51, the side grippers, 67 and 68, and the front gripper, 85, all operating together substantially as described." It will be noticed that this claim leaves out the fingers as an element in the combination. The

prior art discloses that the fingers were the only novel feature in the patent. All the elements which comprise this claim were old. In prior machines we find the combination of a stationary carriage, presser plate, and side and front grippers; also the combination of a reciprocating carriage, presser plate, and side grippers. The claim at most, therefore, can only cover a narrow invention. The infringement of this claim depends upon whether there is found in defendant's machine the equivalent of the reciprocating carriage. We do not understand that the claim is limited by its terms to a reciprocating carriage, provided the defendant uses an equivalent in the same combination. The argument of the plaintiff is that reciprocating and rotating carriages were well-known equivalents at this time, and that, as the defendant uses a rotary carriage in combination with the other elements of the claim, it infringes; but this must be upon the assumption that the two carriages perform the same function, or were well-known equivalents.

The defendant contends that it does not use any carriage in the sense of the plaintiff's patent. In the plaintiff's machine the blank is delivered from the feed rolls upon the carriage or table, and is then clamped upon it by the presser plate and grippers acting simultaneously, and is so held during the action of the fingers in making the diamond fold. Such was the general function of the table in all prior machines.

In the defendant's machine the lower feed roll must be held to be the equivalent of the reciprocating table, if such table can be said to exist at all in the machine. This lower feed roll has upon it a front gripper and side grippers, which operate in opening the bottom of the bag; but these grippers do not act at the same time to press the blank down upon the feed roll, nor does the tucker so act. After the front gripper seizes the lower ply of the blank, the bottom is opened while the blank is suspended between the grippers and the rolls which hold the upper ply. At no time, therefore, is the blank operated upon on a table, within the meaning of the plaintiff's patent. Again, the front gripper in the defendant's machine is not the front gripper of the patent. The front gripper on defendant's feed roll only assists to open the bag in part, and ceases to operate before the side grippers and the presser plate come into action. In the plaintiff's machine all the grippers and the presser plate act instantaneously to bind the blank to the bed or carriage. If the lower feed roll can be said to be in any proper sense a table, it does not have the function of the plaintiff's reciprocating carriage. Giving, therefore, as broad a construction to this claim as the state of the art will justify, we do not think the defendant's machine contains the same or the equivalent organization or combination of parts.

The remaining claims are for combinations or subcombinations of the various parts covered by the first two claims, and they all include as elements the fingers and reciprocating carriage. For the reasons already given there is no infringement of these claims.

Decree of the circuit court affirmed.