New Process Fermentation Co. Vs. Maus

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Appellant : New Process Fermentation Co.

Respondent : Maus

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New Process Fermentation Company v. Maus

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122 U.S. 413

APPEAL FROM THE CIRCUIT COURT OF THE UNITED

STATES FOR THE DISTRICT OF INDIANA

SYLLABUS

Claim 3 of letters patent No. 215,679, granted to George Bartholomae, as assignee of Leonard Meller and Edmund Hofmann, as inventors, May 20, 1819, for an "improvement in processes for making beer," namely,

"3. The process of preparing and preserving beer for the market, which consists in holding it under controllable pressure of carbonic acid gas from the beginning of the kraeusen stage until such time as it is transferred to kegs and bunged, substantially as described,"

is a valid claim to the process it purports to cover.

The state of the art of brewing beer, so far as it concerns the invention of the patentees, explained.

In equity. Decree dismissing the bill. The plaintiff appealed.

The case is stated in the opinion of the court.

MR. JUSTICE BLATCHFORD delivered the opinion of the Court.

This is a suit in equity, brought in the Circuit Court of the United States for the District of Indiana, by the New Process Fermentation Company, an Illinois corporation, against Magdalena Maus, Albert C. Maus, Casper J. Maus, Frank A. Maus, and Mathias A. Maus, for the infringement of letters patent No. 215,679, granted May 20, 1879, to George Bartholomae as assignee of Leonard Meller and Edmund Hofmann, as inventors, for an "improvement in processes for making beer," subject to the limitation prescribed by 4887 of the Revised Statutes, by reason of the inventions having been patented in

France, November, 30, 1876, and in Belgium, February 28, 1877. The specification and drawing and claims of the patent are as follows:

"To all whom it may concern:"

"Be it known that we, Leonard Meller, of Ludwigshafen-on-the-Rhine, in the State of Bavaria, and Edmund Hofmann, of Mannheim, in the State of Baden, Germany, have invented certain new and useful improvements in the art of making beer, and we hereby declare the following to be a full, clear, and exact description thereof, reference being had to the accompanying drawing, making a part of this specification, in which the figure represents an end view of our apparatus, with the water column in section."

"Heretofore, in brewing beer, after cooking and cooling, the beer had been put into open vessels to ferment. The fermentation lasts say fifteen days, and then the beer is drawn off from the yeast into large casks nearly closed, where it remains from one to six months to settle, and among the sediment there will still remain some yeast. The beer is then pumped into shavings casks, and is mixed with young beer (Kraeusen), which starts a mild fermentation, lasting from ten to fifteen days, until the generation of the gas is reduced to a minimum. During this fermentation, the beer effervesces through means of the carbonic acid gas rising, and the lighter particles of yeast and solid matter are thrown to the top, forming a foam, which, during the ebullition, runs over the edges of the opening in the cask, and carrying along a small portion (more or less) of the beer, which is wasted, and this waste has to be replaced by refilling with new beer daily. This wastage we estimate, from practical experience in the manufacture, to be about one barrel in every forty, more or less. This waste beer, running down around the casks and on the floor of the cellars, sours and produces a mildew, which impregnates the air with foul vapors highly injurious to the workmen, and, permeating the beer in the casks, alters its flavor, and, in instances where the mildew penetrates the wood of the casks, spoils the beer entirely. This fouling of the barrels requires that they should be washed outside, from time to "

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image:a

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time, and the water used in this washing always raises the temperature of the cellar, and wastes the ice which is therein packed to keep the temperature about 41 Fahrenheit. After the beer has been in the shavings cask from ten to fifteen days, the gelatine or other clarifying medium is introduced, and at the end of a couple of days the beer is entirely clear. The shavings cask is then bunged up tightly for from three to five days, to confine the last portions of the rising carbonic acid gas. This charges the beer with carbonic acid gas (CO2), so as to make it merchantable, and it must be drawn off at once into kegs and used, otherwise the pressure on the shavings cask may burst it.

"In selecting the time for drawing off the beer from the shavings casks into the kegs, to send it to market, the beer should never be under a pressure of over seven pounds to the square inch, otherwise the keg fills with foam in the drawing off, and, the bubbles subsiding, leave an air space over the liquid beer, which absorbs a portion of the carbonic acid gas, and soon leaves the beer in the keg flat. As the art is now practiced, arriving at the proper degree of pressure when to put the beer in kegs is merely a matter of judgment or guess by the foreman, and no two shavings casks will be drawn off at precisely the same pressure, and the effervescing qualities of the beer will vary considerably, much to the detriment of sales by the brewer. If the beer is not put in market at once at this stage, the bungs have to be removed from the casks, and the gas allowed to escape. Then the escaping gas stirs up the yeast and impurities that have settled to the bottom, and the beer has to go again through the entire shavings cask step in the process."

"Under the processes now in use, it requires about twenty days to put beer on the market after it is pumped into the shavings casks. This delay requires brewers to keep a large amount of capital invested during the time in unfinished beer, and it is highly important to decrease this time of preparation."

"The essential features of our invention have been patented in foreign countries as follows: France, to Leo. Meller & Co., filed September 28, 1876, allowed and countersigned, Paris,

November 30, 1876, No. 114,737; Belgium, to Leo. Meller & Co., filed February 14, 1877, allowed and countersigned, Bruxelles, February 28, 1877, No. 41,517."

"The object of our invention is to overcome the difficulties above named, and also to produce in a shorter time a better quality of beer, containing more sugar and less alcohol."

"Our invention consists in treating the beer when in the shavings cask step of the process, in one or more closed casks, under automatically controllable carbonic acid gas pressure, generated either by the mild fermentation of the beer or artificially. This equalizes the pressure in such cask or series of casks, and the effervescing quality of the beer in all the casks, when two or more are connected together, is uniform."

"The cask or casks being closed, none of the beer wastes by running over, and the foul smells and washing of the casks and cellars are avoided. The escaping carbonic acid gas is conducted from the relief valve to the open air, and does not settle in the brewing cellars, to endanger life."

"Our invention consists, further, in similarly treating the beer when in the kraeusen stage, or subsequently thereto, or both, or when in the settling casks ('ruh-beer'), this being the second fermenting stage -- that is to say, our invention consists in so treating the beer at any time or times previous to racking off and bunging or bottling."

"In order that those skilled in the art may make and use our invention, we will proceed to describe the manner in which we have carried it out."

"In the drawings, A A are shavings casks, having faucets *a a* , provided with valves *i i* , inserted tightly in their bungs. These faucets are connected to taps N on the main pipe *a'* , by means of flexible sections *k* , provided with couplings. The taps or connections have valves, *i' i'* . Pipe *a'* bends upward, and passes above the level of a water column C, and then, passing downward, enters the

base of the column at *x* , where it is provided with a cock, *b'* . The water column or vessel C has a faucet *d* to draw off water, when desired to decrease the pressure. A depending branch pipe *e* and cock *e'* serve to

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discharge any condensed moisture from pipe *a* , and a pressure gauge *e2* serves to indicate the pressure."

"By means of a gas generator located at *h* and connected to pipe a by means of pipe *f* , having cock *g* , we are enabled to test the joints of the apparatus and drive all atmospheric air from the pipes when the operation begins."

"At the top of the water column is a conical cap terminating in a pipe *E* , which is projected out of the building and leads all the gas into the open air. Located within this cap is a conical diaphragm C', centrally located, so that, should the escape of the gas become so rapid as to lift the body of water upward, the water will be arrested by the diaphragm, while the gas escapes around its edges."

"It is evident that the pressure in all the shavings casks connected with pipe *a'* will be equal, and will be kept so indefinitely by means of the water column, and, as far as the enlivening of the beer is concerned, it is always ready for market, be it ten days or four months, whereas in processes now practiced, beer has to be bunged at a particular time for a particular day's market."

"Our process enables the brewer to keep on hand merchantable beer which can be shipped instantly, or, if trade decreases, it enables him to keep his stock on hand without deterioration till the demand is made for it."

"All that has been said above in relation to a series of casks applies, of course, equally to treatment in a single cask."

"It is obvious that means other than a water column may be adopted for equalizing the pressure of the gas without departing from the spirit of our invention -- as, for example, safety valves and the like -- and the apparatus is susceptible of many other variations without affecting the process itself, which constitutes the essence

of our invention."

"By using our process, we are enabled to clarify the beer and clear it of impurities in eight days or less, whereas in the ordinary process it takes from twelve to twenty days. This immense gain in time we ascribe to the following action: the air being forced out of the pipes, the carbonic acid fills them and the space in the casks above the beer. Then the gas

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slowly accumulates in the space above the beer until the pressure above is such as to overcome the density of the beer and reenter it, so as to charge it up to the pressure for which the column is set. This creates, in a manner, an equilibrium between the rising bubbles and the pressure above, during which gravity can act rapidly on the yeast and impurities in the beer and carry them down among the shavings at the bottom of the cask, where they remain."

"We introduce the clarifying gelatine into the shavings casks after the beer is introduced, and before connecting with pipe *a'* , and actual practice has demonstrated to us that to clarify the beer by our process requires only about one-half of the gelatine heretofore used. This saving, together with the saving of the waste beer heretofore mentioned (one or more barrels in every forty), and the saving of labor will greatly cheapen the production of beer. When we desire to make beer for bottling, we attach our apparatus to the settling casks filled with beer, and no young beer (kraeusen) is added, but a little gelatine is added, and the beer allowed to remain for from fourteen to twenty days, until it becomes 'lively' (saturated with CO2), and it is then bottled."

"We find that bottled beer prepared this way is healthier, and will last in good condition two or three months, whereas the beer bottled in the usual manner with Kraeusen beer lasts only for eight or ten days if pure and not steamed after bottling, the latter spoiling the aroma and flavor."

"Having thus described our invention, what we claim as new and desire to secure by letters patent is:"

"1. The process of preparing beer for the market, which consists in holding it under controllable pressure of carbonic acid gas when in the kraeusen stage, substantially as set forth."

"2. The process of treating beer when in the Kraeusen stage which consists in holding it in a vessel under automatically controllable pressure of carbonic acid gas, substantially as described."

"3. The process of preparing and preserving beer for the

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market which consists in holding it under controllable pressure of carbonic acid gas from the beginning of the Kraeusen stage until such time as it is transferred to kegs and bunged, substantially as described."

"4. The method herein described of preserving beer in a marketable condition after it has passed the kraeusen stage, which consists in holding it under pressure of carbonic acid gas, said pressure being automatically regulated by a counteracting hydrostatic pressure, substantially as described."

"5. The process of treating beer when in the second fermenting stage ('ruh-beer'), which consists in holding it under automatically controllable pressure of carbonic acid gas, substantially as described."

"6. The process of treating beer in the course of its manufacture which consists in holding it in closed connected vessels under automatically controlled pressure of carbonic acid gas, substantially as described."

"7. The process of clarifying and settling beer in a series of shavings casks, and equalizing the rate of fermentation in all of them, whereby the beer is more rapidly and thoroughly clarified, and will be ready for racking off in all the casks at the same time, and can be kept so, which consists in holding the beer in closed connected shavings casks under automatically controlled low pressure of carbonic acid gas, substantially as described."

"8. Casks A A, provided with cocks *a a* , flexible sections *k* , and taps N N, in combination with main pipe *a'* , water column C, and pressure gauge *e2* , all constructed, arranged, and operated as and for the purposes set forth."

Infringement is alleged of claims 1, 2, 3, 4, 6, and 7. The circuit court dismissed the bill, and the plaintiff has appealed.

The principal contest in the case is as to the validity of the patent as a patent for a process. The state of the art of brewing beer, so far as it concerns the invention of the patentees, is set forth in the specification. That invention, so far as it is applicable to what is called the Kraeusen stage of beer, is applicable to the beer after it is pumped into the shavings casks and the kraeusen beer is added for the purpose of starting

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a mild fermentation. By the old process, the fermentation lasted from ten to fifteen days, until the generation of the gas was reduced to a minimum. By the rising of the carbonic acid gas through the effervescence of the beer, a foam was formed which ran over the edges of the open bung hole and wasted more or less of the beer, say one barrel in every forty. This waste beer soured and mildewed, produced foul vapors injurious to health, altered the flavor of the beer in the casks, and sometimes spoiled it entirely. The washing of the barrels on the outside was required, the temperature of the cellar was raised by the use of the water for the washing, and the ice was wasted which was packed in the cellar to keep the temperature at about 41 Fahrenheit. After the beer had been in the shavings casks from ten to 15 days, gelatine or some other clarifying medium was introduced, and at the end of a couple of days, the beer was entirely clear. The shavings cask was then bunged up tightly for from three to five days to confine the last portions of the rising carbonic acid gas and charge the beer with it, to make it merchantable. The proper degree of pressure in the shavings cask at which to draw off the beer into kegs for market was a matter of judgment in the workman. If the pressure was over seven pounds to the square inch, the keg filled with foam in drawing it off and the bubbles subsiding left an air space over the liquid beer which absorbed a

portion of the carbonic acid gas, and soon left the beer in the keg flat. As a result of the fact that the proper degree of pressure was merely a matter of judgment, no two shavings casks were drawn off at precisely the same pressure, and the effervescing qualities of the beer would vary considerably. If the beer was not put into market at once at the proper stage, the bungs had to be removed from the shavings casks and the gas allowed to escape. The escaping gas then stirred up the yeast and impurities which had settled at the bottom, and the beer had to go again through the entire shavings cask stage in the process. It required about twenty days to put beer on the market after it was pumped into the shavings casks. This delay required brewers to keep a large amount of capital invested during the time in unfinished beer,

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and a decrease of this time of preparation was highly important.

Upon these premises, the object of the invention of the patentees was to overcome the difficulties above named. In this view, the statement of the invention in the specification is in these words:

"Our invention consists in treating the beer when in the shavings cask step of the process in one or more closed casks under automatically controlled carbonic acid gas pressure, generated either by the mild fermentation of the beer or artificially. This equalizes the pressure in such cask or series of casks, and the effervescing quality of the beer in all the casks, when two or more are connected together, is uniform. The cask or casks being closed, none of the beer wastes by running over, and the foul smells and washing of the casks and cellars are avoided. The escaping carbonic acid gas is conducted from the relief valve to the open air, and does not settle in the brewing cellars, to endanger life."

This, is fairly to be read as a statement that the beer is to be thus treated during the whole of its subjection to the shavings casks stage of the process, whether in one closed cask or in two or more closed casks connected together. The statement is that the cask or casks are to be closed -- that is, closed throughout

the shavings casks stage of the process, and kept during that process under automatically controllable carbonic acid gas pressure, generated either by the mild fermentation of the beer or artificially. It is also stated that none of the beer wastes by running over, and that the foul smells and washing of the casks and cellars are avoided, and that the escaping carbonic acid gas is conducted to the open air. These consequences cannot follow, nor can the advantages of the invention set forth be fully availed of, unless the casks are closed from the beginning of the shavings cask Kraeusen stage. Adequate means for working this process and securing this result are set forth in the specification; also means for connecting together a series of shavings casks, so as to secure equal pressure in all of them.

The specification further says:

"By using our process, we are enabled to clarify the beer and clear it of impurities in eight

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days or less, whereas in the ordinary process, it takes from twelve to twenty days. This immense gain in time we ascribe to the following action: the air being forced out of the pipes, the carbonic acid fills them and the space in the casks above the beer. Then the gas slowly accumulated in the space above the beer until the pressure above is such as to overcome the density of the beer and reenter it, so as to charge it up to the pressure for which the column is set. This creates, in a manner, an equilibrium between the rising bubbles and the pressure above, during which gravity can act rapidly on the yeast and impurities in the beer, and carry them down among the shavings at the bottom of the cask, where they remain. We introduce the clarifying gelatine into the shavings casks after the beer is introduced, and before connecting with pipe *a'* , and actual practice has demonstrated to us that to clarify the beer by our process requires only about one-half of the gelatine heretofore used. This saving, together with the saving of the waste beer heretofore mentioned (one or more barrels in every forty), and the saving of labor, will greatly cheapen the production of beer."

The third claim of the patent is as follows:

"3. The process of preparing and preserving beer for the market, which consists in holding it under controllable pressure of carbonic acid gas from the beginning of the kraeusen stage until such time as it is transferred to kegs and bunged, substantially as described."

This claim covers the real invention of the process of the patentees, if it be their invention and be patentable as a process.

The circuit court, in its opinion, 20 F. 725, 733, held that the most that could be claimed by the patentees was that they applied the controllable pressure, created by the carbonic acid gas in a state of fermentation at an earlier stage than was before known; that the essential parts of the apparatus used were known before; that the same controllable pressure had been applied at various stages of the manufacture; that the application at one stage of the condition of the beer instead of another would seem not to involve anything more than a mere mechanical change, which could be employed by

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anyone skilled in the art, and that the claim of the patent for a particular process, irrespective of the mechanical devices claimed (which the defendants had not used), could not be sustained. But we think that in this view the court erred, and that the third claim of the patent is a valid claim for the process covered by it and described in the specification. The testimony is very full and clear that as a process, it was not known or used before in the art of making beer; that it worked a valuable and important change in that art in the particulars set forth in the specification; that it went at once extensively into use both in Europe and in the United States, and that it was recognized as a new and valuable invention, in published works on the subject, immediately after it was made known.

Professor Haines, the leading expert for the plaintiff, says:

"The Meller and Hofmann system accomplishes, in my opinion, many results which had not before been obtained, and it acts, in doing so, in this way: automatically regulated pressure is applied to the casks during the process of active fermentation, and air is thereby, of course, excluded. Under this increased pressure and the exclusion of air, fermentation takes place more regularly, and the impurities in the beer settle more rapidly. By the exclusion of the air, moreover, fewer impurities are produced, for it is a demonstrated fact that when oxygen is excluded from a fermenting mixture, fewer yeast cells and other solids are generated. Not only is there therefore produced less matter to subside, but by the increased pressure, these particles are rendered specifically heavier, and therefore settle much more rapidly. The process, therefore, if applied during the stage of active fermentation, not only regulates the fermentation, but will materially hasten the clarifying of the beer, both of which are objects not obtained, so far as I know, by any previously used process or apparatus."

The invention of the patentees covered by claim 3 is, as stated before, applicable to the beer in the Kraeusen stage in the shavings casks. The shavings in these casks are thin strips of white beech, hazel-nut, or other suitable wood, placed

lengthwise of the cask on its bottom, opposite the bung-hold, and used as a fining medium. Being porous, they absorb the turbid ingredients in the beer and also mechanically arrest them when precipitated. The kraeusen beer which is added to the contents of the shavings casks to produce fermentation is young beer, in full fermentation, the beer or wort to which the kraeusen beer is added in the shavings casks being itself comparatively flat, and not clarified.

Vent-bungs of various descriptions existed before, but were used toward the last stage of the fermentation of the beer in the kraeusen stage in the shavings casks, to confine mechanically the very last of the slowly generating gas, the valve or vent in the bung operating to prevent overpressure or "overbunging," in case there should be delay in drawing off the beer after it became ready for market. The effect of the accumulation of the carbonic acid gas generated in the later stages of

the fermentation was and is to impart more effervescence to the beer. The invention of the patentees is entirely independent of the old and well known vent bungs, and of any prior apparatus for preventing overbunging. It is for the process of bunging the cask simultaneously with the commencement of the active fermentation of the beer in the kraeusen stage. It utilizes the gas to clarify the beer, the pressure of the gas causing the impurities quickly and permanently to deposit themselves on the bottom and sides of the cask instead of being removed, as in the old method, by overflowing and slow deposit. Professor Haines says:

"The novelty and characteristic feature of the process by which its excellent results are produced chiefly arises from its introducing an automatically acting process at an earlier stage of the preparation of beer than has been practiced by other devices. This earlier bunging produces a number of valuable results, one of the most valuable of which is the rapid clarification of the beer. By placing the actively fermenting liquid under adequate automatically controlled pressure and keeping it thus under pressure until drawn off for use, the beer ferments more equably, less sediment is produced, and clarification is more rapid and more certain. It is, then, as I

understand it, not the mechanical application of pressure, but the application of a suitable pressure, beginning with the second active fermentation of the beer and continuing to the close, that constitutes the most valuable and novel feature of this process."

Dr. Ruschhaupt, another expert witness for the plaintiff, says:

"It is an acknowledged fact that the influence of pressure upon a compressible object suspended in a liquid causes it to sink, and also that pressure in closed vessels is propagated to all sides with the same force. For this reason, an ascending or rising of the insoluble impurities cannot take place as long as the pressure continues or increases; however, as soon as the pressure is released or diminished, a rising must necessarily result. With beer especially, such rising

easily occurs, and the lighter impurities will almost at once be drawn into the beer again. Any apparatus which does not allow the pressure to become diminished at any time during the operation, and which is not apt to get out of order or become clogged, like a hydrostatic column, will avoid the drawbacks above referred to, and this object is beyond question fully accomplished by the apparatus patented to Meller and Hofmann. It is not simply a safety valve or vent, but intended to accomplish much more, and to be used, if necessary, in the height of the kraeusen stage. But not in this respect lies the principal advantages of said patent. It new mode of treatment is the main thing. The patent recommends automatic bunging at an earlier stage of manufacture than before practiced, *viz.,* during the kraeusen stage, and for an entirely different purpose, *viz.,* to hasten the clarifying and settling of the beer. The patent suggests in this respect a new and different mode of treatment before the beer is clear and settled. The new process is carried into effect by causing the liquid in the cask to be placed under an even and equal pressure of carbonic acid gas, which is uniformly applied and maintained throughout the treatment, up to the very time of racking off the beer, by means of an automatically working valve or weight, regulated at a prefixed standard of about seven pounds to the square inch. "

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The advantages of the process in practice are thus stated by Mr. Seib, a brewer:

"First, I save on a thirty-barrel cask about a barrel and a half of beer; secondly, my beer will not become overbunged; third, in the old mode of treating beer, when the liquid was two to three weeks on shavings, it became a shavings taste, which is not the case under the Meller and Hofmann method. You may keep the beer two months in the latter way. Fourth, it also involves material financial advantages, in this, if the beer is not use at the particular time, it needs not, as of old, be pumped over into other casks to guard against the results of overbunging. There is another most important advantage arising from this early process of bunging. It prevents overflowage and the yeast souring the floors and cellars, and, as the yeast is a plant and continuous to grow, the atmosphere becomes corrupted, which reacts on the beer in the cellar."

Contemporary publications give to the patentees the credit of this invention. In the "Manual of Beer Brewing," published at Weimar, in 1877, by Prof. Ladislaus Von Wagner at 728 and 729, Meller's method of treatment, in using carbonic acid gas to clarify beer, is spoken of as successful and as having been already introduced for four years and spread over the whole European continent. In a treatise on beer brewing published at Braunschweig in 1877 by Dr. Carl Lintner, the invention, as one for putting the beer, when drawn off into casks immediately under the pressure of pure carbonic acid gas, is ascribed to Meller. In "The American Beer Brewer," published at New York in June, 1878, by A. Schwartz, the invention is spoken of as one which the writer had seen in 1877 at the brewery of Mr. Hofmann at Mannheim, in Germany, carried out by a bunging apparatus such as is described in the patent.

Within the rules laid down by this Court in *Corning v. Burden,* 15 How. 252, 56 U. S. 267 , in *Cochrane v. Deener,* 94 U. S. 780 , 94 U. S. 787 -788, and in *Tilghman v. Proctor,* 102 U. S. 707 , 102 U. S. 722 , 102 U. S. 724 -725, we think that the method or art covered by the third claim of the patent is patentable as a process irrespective of the apparatus or instrumentality for carrying it out. It is the

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performing of a series of acts upon the beer in the kraeusen stage, producing new and useful results in the art of making marketable beer. The process consists not in merely applying an apparatus to the cask at some period of the kraeusen stage of the beer, but consists in this, that when the beer has been put into the casks, and the kraeusen beer is added to it, and the apparatus is applied at the beginning of the kraeusen stage, the beer will be kept under a controllable pressure of carbonic acid gas until such time as it is fit to be transferred to the kegs for market, such pressure resulting in the complete and speedy clarification of the beer, although it is in a state of active fermentation in the closed shavings casks, with the incidental results of no loss of beer, no fouling of the casks or the cellar, no alteration of the flavor of the beer, and no danger to the health of the workmen. This is, as was said in *Cochrane v. Deener,* "a mode of treatment of certain

materials to produce a given result," and "an act, or a series of acts, performed upon the subject matter to be transformed and reduced to a different state or thing," and "requires that certain things should be done with certain substances, and in a certain order." It is therefore a process or art. The apparatus for carrying out the process is of secondary consequence, and may itself be old, separately considered, without invalidating the patent, if the process be new and produces a new result.

There appears also to be a new principle of action involved in the invention of the patentees. The carbonic acid gas generated by the fermentation in the cask, instead of being allowed to continually ascend, as it does with an open bung hole, keeping the liquid constantly in a turbid state and overflowing at the bung hole, is made, as stated in the specification, to first accumulate in the space above the beer in the closed cask, until the pressure is such that the gas overcomes the density of the beer and enters it again, and charges it up to the pressure at which the water column is set, thus creating an equilibrium between the rising bubbles of gas and the pressure above, so that gravity can act on the yeast and impurities and carry them down so that they will remain with

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the shavings at the bottom. This is a new use, in the treatment of fermenting beer, of the carbonic acid gas which it generates, and a new method or process of hastening the clarifying and settling of the beer.

This being the proper construction of the third claim of the patent, we are prepared to consider the question of the novelty of the process covered by the claim in the light in which it has been explained.

The United States patent to George Wallace, No. 62,581, granted March 5, 1867, does not exhibit any such process. The apparatus shown in it acted on a directly opposite principle, and was designed to stir up the fermenting medium and accelerate the fermentation and decomposition of mash. Professor Haines says, in regard to it:

"I have examined the Wallace patent and compared it with the process and apparatus of Meller and Hofmann. In my opinion, the two are radically different. The Wallace patent introduces to the bottom of one fermenting tank a pipe which is connected with the upper portion of the other fermenting cask. Now if any excess of pressure should occur in either cask over what there is in the other, a quantity of carbonic acid gas will be forced to the very bottom of the cask having the smaller pressure, and in this way the yeast and other sediment will be thoroughly stirred up and diffused through the fermenting liquid. This would unquestionably increase the rapidity of fermentation, but it would accomplish exactly the opposite result of what the Meller and Hofmann process contemplates -- namely the forcing down of the sediment so as to clarify the beer, and not its agitation and dissemination through the fluid. It seems to me, therefore, that the Wallace apparatus and process, as figured and described in patent 62,581, would not and could not be used for the same purposes that the Meller and Hofmann process is employed."

Dr. Ruschhaupt testifies to the same effect.

The United States patent No. 63,636, granted to Thomas R. Hicks, April 9, 1867, the United States patent No. 90,349, granted to William Dietrichsen, May 25, 1869, and United States patent No. 115,950, granted to William Gilham, June

13, 1871, do not any of them disclose the process of the appellant of controlling the action of beer in active fermentation in the kraeusen stage for the purpose of clarification and preparation for market by means of the controllable pressure of carbonic acid gas. The patent to Gilham is for the production of sparkling wine by charging the wine under pressure with the carbonic acid gas generated by the wine during the process of fermentation. It does not develop the process of the appellant as applied to beer in the kraeusen stage, nor does it disclose the fact that Gilham knew of the existence of any such process.

The patent to Henry Schlaudeman, No. 204,687, of June 11, 1878, the patent to John M. Pfaudler, No. 205,572, of July 2, 1878, the patent to Theodore F. Straub, No. 208,771, of October 8, 1878, and the patent to Frank Fehr, No. 215,596, of May 20, 1879. are later in date than the invention of Meller and Hofmann, and all of them are subsequent in date to the introduction into use of that invention in this country, in July or August, 1877.

The experiments of Clement A. Maus were in September, 1877. The apparatus of Jacob W. Loeper was an automatic vent bung, but it is not shown to have been used in carrying out any such process as that of the appellant. The apparatus of Herman Sturm was manifestly only an experiment, abandoned and given up before the invention of Meller and Hofmann was introduced. It is not satisfactorily shown to have been used on shavings casks with the beer in the kraeusen stage. Dr. Ruschhaupt testifies that the devices of Sturm, all of them, belong to the class of automatic vent bungs used during the last stages of after-fermentation; that they were not capable of being used during the kraeusen stage in shavings casks because they were constructed to act under a much lower pressure than that spoken of in the patent to Meller and Hofmann; that the one with the mercury gauge is intended to work under a pressure of only about one pound to the square inch, and the others were liable to get out of order by the clogging and rusting of the springs, and that they were only applied to let off the surplus carbonic acid gas from

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lager beer casks to prevent their bursting. Professor Haines testifies as follows in regard to the Sturm apparatus:

"In my opinion, the forms of apparatus described and figured in the testimony of General Sturm could not be practically applied for the purposes of the Meller and Hofmann process, for the bungs figured and described would certainly become clogged by the foam that is sent upward in considerable quantity during the active fermentation, and, becoming clogged, would either cease to act or else remain permanently open. The other device figured and described contemplates,

according to the description, the application of a very trivial pressure, stated by the witness himself as equivalent to about a pound per square inch. As I before testified, I believe such a trivial pressure would not bring about the effects obtained by the Meller and Hofmann process, although it would be sufficient to charge the beer with a certain amount of gas, and prevent the casks from bursting, which, as I understand it, was the object of the apparatus now spoken of. . . . It is difficult to determine from the testimony of the witness exactly at what stage of the brewing of the beer the apparatuses were employed, but as he states that they were made in 1860, at which time the treating of beer with kraeusen in shavings casks was not practiced, it is evident that the apparatuses were not intended to be applied during this stage of brewing."

It is testified that the appellant's process of treating beer under the automatically controllable pressure of carbonic acid gas is of great value in the brewing business, and has come into general use and been put up in about eighty breweries, many of which are among the largest in the United States.

There is no doubt whatever that the defendants have used the process covered by the third claim of the patent. One of the defendants, Frank A. Maus, testifies that in the fall of 1878 or the spring of 1879, the defendants commenced using an apparatus which applies the controllable pressure of carbonic acid gas to the beer in the kraeusen stage; that as soon as the finings are added to the beer in the shavings cask, they attach the apparatus; that sometimes, however, it is not attached until a day or two after the kraeusen and finings are

added; that they keep it attached from eight to twenty days, until the beer is drawn off for the market; that on an average, they gain about two days by the use of the apparatus, and that they avoid the running over of the foaming yeast through the bung hole.

We have confined our consideration of this case to the third claim of the patent, as that is the one which distinctly embodies the invention of the patentees and it has

been infringed by the defendants. It will be time enough to consider the other process claims, and the eighth claim, in cases involving their infringement, where the third claim is not also infringed. In the present case it appears that the defendants have used "the process of preparing and preserving beer for the market" by

"holding it under controllable pressure of carbonic acid gas from the beginning of the kraeusen stage until such time as it is transferred to kegs and bunged, substantially as described"

in the specification of the patent.

The decree of the circuit court is reversed, and the case is remanded to that court with a direction to enter a decree establishing the validity of the third claim of the patent and awarding a perpetual injunction and an account of profits and damages, and to take such further proceedings in the suit as may not be inconsistent with this opinion.