

Consolidated Roller Mill Co. Vs. Walker

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Appellant : Consolidated Roller Mill Co.

Respondent : Walker

Judgement :

Consolidated Roller Mill Co. v. Walker - 138 U.S. 124 (1891)

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Consolidated Roller Mill Company v. Walker

No. 1485

Submitted January 9, 1891

Decided January 26, 1891

138 U.S. 124

APPEAL FROM THE CIRCUIT COURT OF THE UNITED

STATES FOR THE WESTERN DISTRICT OF PENNSYLVANIA

SYLLABUS

Claim 1 of letters patent No. 228,525, granted June 8, 1880, to William D. Gray for an improvement in roller grinding mills, namely,

"1. In a roller grinding mill, the combination of the countershaft provided with pulleys at both ends and having said ends mounted in vertically and independently adjustable bearings, the rolls C E having pulleys connected by belts with one end of the countershaft, and the rolls P F independently connected by belts with the other end of the countershaft, as shown,"

is invalid because, in view of the state of the art, it does not embody a patentable invention.

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The combination set forth in that claim evinces only the exercise of ordinary mechanical or engineering skill.

That claim is not infringed by the use of a roller mill made in accordance with letters patent No. 334,460, granted January 19, 1886, to John T. Obenchain.

In Equity. Decree dismissing the bill. Plaintiff appealed. The case is stated in the opinion.

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 Western District of Pennsylvania by the Consolidated Roller Mill Company against R. Co. Walker, for the infringement of claim 1 of letters patent No. 228,525, granted June 8, 1880, on an application filed May 2, 1879, to William D. Gray for an improvement in roller grinding mills. The circuit court, held by Judges McKennan and Acheson, entered a decree dismissing the bill, with costs. The case was heard on pleadings and proofs. The answer denied the validity of the patent, charged want of novelty and of patentability, and denied infringement. The

opinion of the court (43 F. 575) was written by Judge Acheson.

The specification and claims of the patent are as follows:

"My invention relates to that class of mills in which horizontal grinding rolls arranged in pairs are employed, and the invention consists in the improved arrangement of belts and pulleys for communicating motion to the rolls, and in other minor details hereinafter described in detail. In the accompanying drawings, Figure 1 represents a side elevation of the same; Fig. 2, a top plan view of the rolls and their operating belts, and Fig. 3, an end elevation of the same, partly in section. It has been found by experience that when the rolls are driven by gearing, a great deal of noise and a jarring of the parts of the apparatus and trembling of the mill-floor result, and this

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jarring and trembling in turn cause an unevenness of operation or grinding, and a rapid and uneven wear of the rolls. To obviate these difficulties and produce an even steady motion, I discard the gearing hitherto employed and substitute therefor a system of belting, arranged in a peculiar manner, to give the proper direction and speed to the rolls. In the drawings, A represents the frame or body of the machine, in the upper part of which are mounted, in pairs, a series of grinding or crushing rolls, C, D, E, F. Above the grinding rolls is arranged a hopper provided with feeding rolls G, H, arranged to deliver the grain to each pair of rolls. B represents a countershaft, which is represented in the drawings as extending transversely through the base of the frame or body A, parallel with the grinding rolls, but which may, if desired, be located entirely without the machine. As represented in Figs. 1 and 2, the grinding rolls are furnished alternately at opposite ends each with a belt wheel or pulley, while the countershaft B is furnished at one end with one wheel or pulley and at its opposite end with two. N represents the main driving belt, which passes to and around the pulley *c* of the roll C, thence downward and around pulley *b* of the countershaft, B; thence upward and around pulley *e* of the roll E, and back to the source of power, imparting to the rolls C and E a motion in one direction, and to the countershaft a motion in the reverse

direction. From the pulleys $b' b''$ on the rear end of the countershaft, B, belts P and R pass upward and around pulleys d and f , of the rolls D, F, as shown in Fig. 2, imparting to said rolls a motion the reverse of that of the rolls C, E. In this way, the two rolls of each set are caused to revolve toward each other while being all driven from a common source primarily."

"The use of belting obviates all the noise incident to gearing, and produces a much more even and steady motion, each roller being driven from the countershaft, instead of one from another, as heretofore. Another advantage incident to the arrangement of belting above described is that by simply removing the pulley of any shaft and replacing it with another of proper size, any desired difference in the speed of the rolls

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may be obtained, whereas in the case of gearing, this cannot be accomplished except through the use of a very complicated arrangement of intermediate wheels. In order to adapt the countershaft B to perform the double purpose of reversing the motion of certain of the rolls, and of acting as a belt tightener, it is mounted at opposite sides of the frame or body A, in boxes swiveled or hung in yokes L, sliding vertically in guides or boxes K, and adjusted up and down therein by screw rods or stems S, the swivel boxes permitting a slightly greater movement of the shaft B at the one end than at the other, without interfering with its free rotation, and thereby permitting the tightening of the belt or belts at one side of the machine without disturbing those at the other. In order to adjust and maintain the rolls C, D, and E, F, in proper relation to each other, the two outer rolls, C and F, are carried in sliding boxes, which are formed each with a T rib or standard, m , moving in a groove or way of corresponding shape, the rolls being held up to their operative position by springs U, which, in turn, are regulated in pressure by screws T. Clamping screws may be arranged to secure the sliding boxes Q in any desired position. By the above arrangement of the sliding boxes, they are prevented from being advanced or retracted unequally, and thereby giving the rolls a 'winding' position. It is desirable that, when the rolls are not employed in grinding, they should be held apart, as otherwise they would be liable to injury by direct contact,

and also subjected to unnecessary wear. To accomplish their ready separation, I place just in front of each sliding box, Q, a rotating cam or eccentric, Y, which, when turned in one direction, permits the box to be advanced, but, when given a partial revolution about its axis, forces and holds back the same."

"The meal, after being crushed by the rollers, sometimes packs or cakes together, and for the purpose of regranulating the same, it is passed through a disintegrator. The disintegrator cylinder may be mounted on and driven by the countershaft, B, as shown in Fig. 3, in which case the usual surrounding shell or casing [shown in the drawings] will need to be adjustable vertically. "

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"The peculiar manner of or means for adjusting the shell forms no part of the present invention, and need not therefor be described in detail herein. Many arrangements, such as the use of bolts and slots, or adjusting screws, for example, will suggest themselves to the skilled mechanic."

"Machines of this class are found to be impaired in their operation through the heating of the roller journals. To overcome this defect, I form on the shafts of the rollers, and also on the countershaft, near each end, a collar, x , which serves both to prevent end play of the shaft and to carry upward continually a supply of oil from the chamber or supply, z , to the upper side of the shaft and box, whence it spreads out over the entire surface of the bearing and journal. The boxes are each formed with an annular oil chamber, v , at each end, communicating by inclined passages, w , with the supply chamber or sink, z . In this way, a perfect lubrication of the bearings is constantly maintained, and heating is obviated. The feed rolls, G, H, are furnished at their ends with pulleys, g, h, which are driven by belts from the grinding rolls, D, E, which, being stationary, cannot interfere with the tension of the belts, as would the adjustable rolls, C, F."

"I am aware that various devices have hitherto been employed to regulate the distance between the rolls in order to govern the fineness of the material delivered from them, and I am also aware that shafts have been made movable in such

manner as to tighten belts passing over pulleys on other shafts, and I lay no claim thereto; but I believe myself the first to construct and organize a grinding mill in the peculiar manner herein shown and described, whereby the single belt is caused to operate the various parts in the required directions, and the disintegrating cylinder caused to keep the belt tight."

"Having thus described my invention, what I claim is:"

"1. In a roller grinding mill, the combination of the countershaft provided with pulleys at both ends and having said ends mounted in vertically and independently adjustable bearings, the rolls C, E, having pulleys connected by belts with one end of the countershaft, and the rolls D, F, independently connected by belts with the other end of the countershaft, as shown. "

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"2. In a roller grinding mill, a disintegrating cylinder connected at its two ends by belts with the rolls, in combination with independently and vertically adjustable supports connected by transverse pivots with the boxes sustaining the ends of the cylinder, in the manner described and shown."

"3. In a roller mill, the combination of the frame, the cylinder, the pivoted bearings, K, the forked arms, L, having the bearings therein, and the screw, S, as shown."

The opinion of the circuit court, after quoting from the specification, says:

"Gray's specification, as our quotations therefrom indicate, suggests the idea that he was the first to apply belt drives to roller grinding mills. But the fact is otherwise, as the proofs abundantly show. Nor was he the first to discard from such mills cog gearing and friction gears altogether, and substitute therefor belt driving."

The opinion then refers to Mechwart's Austrian patent, granted August 3, 1875, extracts from which, as found in the record, are as follows:

"The arrangement invented by me has for its object an advance in the former method of driving the cooperating rollers of any particular roller-mill. This end has

heretofore been obtained exclusively either by the intermeshing of both rollers through the means of spur gear or else through the naked driving of the one roller from the driven roller by means of friction produced through any pressure whatever between the rollers. . . . The substance of the invention, which I consider new and desirable for patent, consists in the use of belts for the driving of each single roller of a pair in roller mills for the begetting of mill products in any desired relation of the two cooperating rolls to each other. Heretofore, in roller mills, one roll of a pair has been driven from the other by means of spur gearing, or by means of friction caused by the pressure between the rollers. The transmission of movement through spur gearing has, however, the disadvantage that, through the unavoidable inequality of the intermeshing, an unequal movement of the rollers ensues, which results, according to experience, in the rapid loss of 'true,' and in unequal wearing away of the rollers. Besides this, the disagreeable rattling of spur gearing, and the rapid

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wearing away of the gears themselves, is a disadvantage. The driving of the second roller by means of friction of the two rollers pressed together is only practical when the chop passes the rollers in very thin strata, and not in coarse particles. In case of the latter, the friction will be relieved, and the driven roller be stopped. Besides this, only an equal peripheral speed of the rollers is permitted by this construction, and therefore it is not applicable when an unequal speed is desired, as, for example, in the grinding of the middlings into flour. These disadvantages the inventor has removed by his application of belt drive to every single roller of a roller pair of a roller mill, which, according to his best knowledge and conscience, has never been employed in similar machines, and is entirely new, so that, by means of such transmission of movement, an equal revolution is obtained, which is impossible with spur gearing. In the accompanying three drawings are six different arrangements, shown for different groupings of the rollers, although I do not thereby intend to exclude every other possible arrangement."

The opinion then proceeds:

"We find therein distinctly set forth the disadvantages resulting from the use of spur gearing in roller grinding mills, viz., the disagreeable rattling, the rapid wearing away of the gears, and the unequal movement and unequal wearing away of the rollers, and also the inefficiency of driving by means of frictional contact between the rolls, which latter, it is set forth, is only practical when the chop passes the rollers in very thin layers, and not in coarse particles, and is not applicable when an unequal peripheral speed of the rolls is required. All these disadvantages, it is declared, are avoided by Mechwart's invention, which consists in driving both cooperating rolls by means of belts, whereby, also, can be obtained an equal and also an unequal peripheral speed, while the diameter of the rolls, as well as the diameter of the belt pulleys, can be varied relatively to each other for different objects. Mechwart's drawings show, as examples, six different arrangements of belting, which, he states, are intended to illustrate 'only some of the different arrangements of the belt drive for roller mills, without exhausting the possible variations

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in its application.' Figure 3, sheet A, shows a machine having two pairs of grinding rolls, the pairs being vertical, and arranged side by side. A shaft, mounted in the machine frame in fixed bearings, carries two pulleys, one at each side of the machine. A belt from one of these pulleys passes around a tightening pulley at the upper right-hand corner of the machine, thence around a pulley on the upper left-hand roll shaft, thence around a pulley on the lower right-hand roll shaft, and thence back to the driving pulley, and by this belt one roll of each pair is driven. From the other pulley, on the other side of the machine, a belt is arranged in a similar manner, so as to drive the other two rolls of the pair. Without further description of the Mechwart system, it is enough to say that his patent disclosed roller grinding mills, single and double, with both vertical and horizontal pairs of rolls arranged side by side, driven by means of belts exclusively, his machine being equipped with adjusting or tightening pulleys, and having a shaft journaled directly into the machine frame and receiving its motion from the prime mover of the mill, either directly or by belt."

It then says:

"But turning now to machinery employed in the arts generally, it is certain that the use of belt gearing interchangeably with or as a substitute for cog gearing was very old, an common before Gray's alleged invention. It was, too, an old and familiar expedient to keep the belt adjusted to a proper degree of tightness by means of tightening pulleys, the shafts of which, in revolving, sometimes did other work about the machine, and shafts had been made movable in such manner as to tighten belts passing over pulleys on other shafts. It was also old, and very common in machine shops and factories of various kinds, to provide an individual machine with a countershaft mounted directly in the machine frame, the countershaft being driven by a belt from the line shaft, and the machine by a belt from the countershaft. Furthermore, it was no new thing to provide the journal boxes or hangers in which countershafts are mounted with means for independently adjusting the ends of the shaft."

It then adds that in view of the things referred to, the court is unable to

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discover any patentable subject matter in claim 1 of Gray's patent, and that it falls directly within the established principle that the application of an old process, machine, or device to a like or analogous purpose, with no change in the mode of application and no result substantially different in its nature, will not sustain a patent even if the new form of result has not before been contemplated, citing *Pennsylvania Railroad v. Locomotive Truck Co.*, [110 U. S. 490](#) , and *Blake v. San Francisco*, [113 U. S. 679](#) .

It then says that it is quite clear, moreover, that the application of belting to drive roller grinding mills to obviate the difficulties incident to the use of cog gearing and to secure the advantages set forth in Gray's specification did not originate with him, and that therefore even were it conceded that his peculiar arrangement is attended with better results than had been attained previously, still this would not sustain the patent, for the mere carrying forward of an original conception,

resulting in an improvement in degree simply, is not invention, citing *Burt v. Evory*, [133 U. S. 349](#) , and that the conclusion is unavoidable that the combination set forth in Gray's first claim evinces only the exercise of ordinary mechanical or engineering skill, citing *Hollister v. Benedict Mfg. Co.*, [113 U. S. 59](#) ; *Thompson v. Boisselier*, [114 U. S. 1](#) ; *Aron v. Manhattan Railway Co.*, [132 U. S. 84](#) ; *Hill v. Wooster*, [132 U. S. 693](#) , [132 U. S. 701](#) , and *Howe Machine Co. v. National Needle Co.*, [134 U. S. 388](#) . We fully concur in these views and conclusions, and regard them as entirely sufficient to justify the decree.

The circuit court further says:

"It seems to be proper for us to add that our judgment is with the defendant upon the defense of noninfringement also. To understand the nature of the invention intended to be covered by the first claim, resort must be had to the specification, and we there find that the 'swivel boxes' are essential to the contemplated greater movement at one end of the shaft than at the other, whereby is effected 'the tightening of the belt or belts at one side of the machine, without disturbing those at the other.' This is apparent on the face of the paragraph hereinbefore quoted at

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length, and the expert testimony is direct and convincing that to the practical working of the described device as a belt tightener this swiveling feature is indispensable. Without the swiveled boxes, Gray would not have 'independently adjustable bearings.' True, those boxes are not expressly mentioned in the claim, but we think they are to be regarded as entering therein by necessary implication, for the reason just stated, as well as by force of the words 'as shown.' Moreover, the prior state of the art would limit the claim to the specific organization shown and described. *Phoenix Caster Co. v. Spiegel*, [133 U. S. 360](#) , [133 U. S. 369](#) . But that organization the defendant does not use. His alleged infringement consists in the use of a roller mill manufactured under and in accordance with letters patent No. 334,460, granted on January 19, 1886, to John T. Obenchain. In the defendant's machine, the journal boxes are rigidly supported so as to be always horizontal, and incapable of any tilting or swiveling motion, and this is

essential to the working of the apparatus. A continuous countershaft is not employed, but three coupled base shafts, the outer shafts or sections being each journaled at the outer end in a vertically adjustable nonswiveling box, and the inner end of each being forked and carrying a loosely pivoted ring. These two rings are connected by a tumbling rod forked at each end and pivoted to the rings, thus forming a universal coupling, and thereby, through the central shaft or tumbling rod, rotary motion is transmitted from one of the end shafts or sections to the other, no matter how much they may differ in vertical position. Now for the reasons already given, we are of opinion that such a construction of Gray's first claim as would embrace the Obenchain device is inadmissible."

We see no reason to doubt the correctness of these views.

Decree affirmed.

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