Aug. 11, 1959 D. L. SCHUBERT 2,898,958

METHOD OF MAKING CROSSCUT WOOD FLAKES AND SAWMILL CROSS GRAIN FLAKING PLANER THEREFOR

Filed Aug. 16, 1957 2 Sheets-Sheet 1

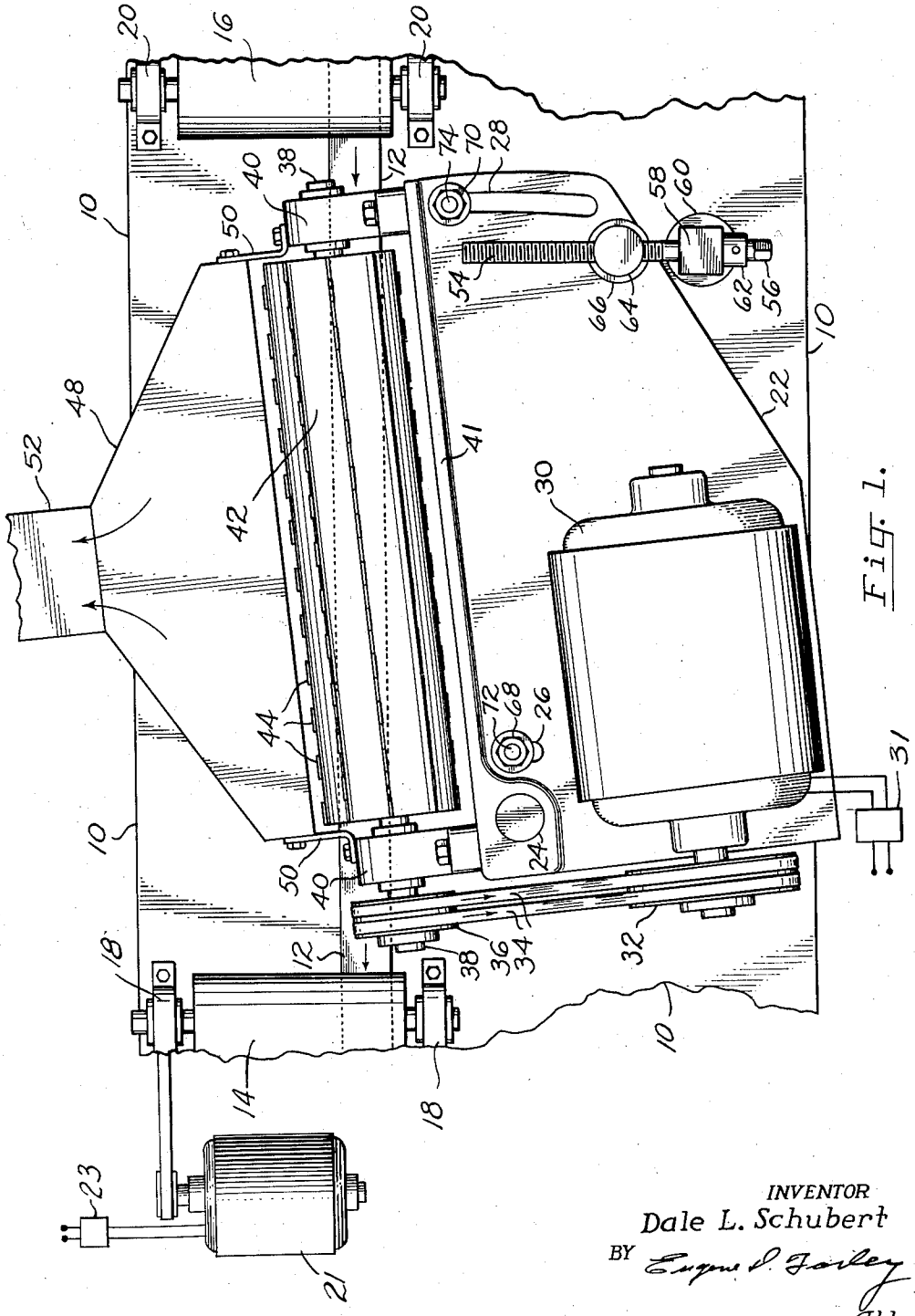


Fig. 1.

INVENTOR
Dale L. Schubert
BY Eugene D. Farley
Atty.

Aug. 11, 1959 D. L. SCHUBERT 2,898,958

METHOD OF MAKING CROSSCUT WOOD FLAKES AND SAWMILL CROSS GRAIN FLAKING PLANER THEREFOR

Filed Aug. 16, 1957 2 Sheets-Sheet 2

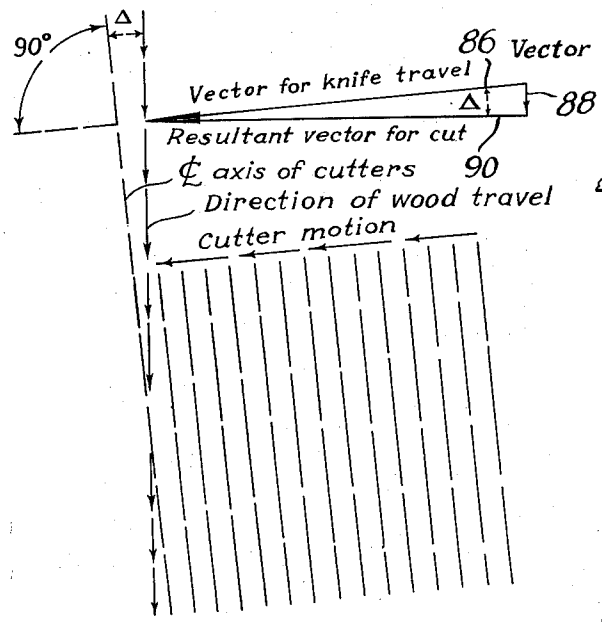


Fig. 2b. Cutters parallel to axis

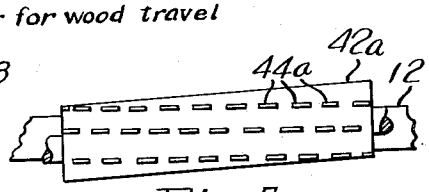


Fig. 5.

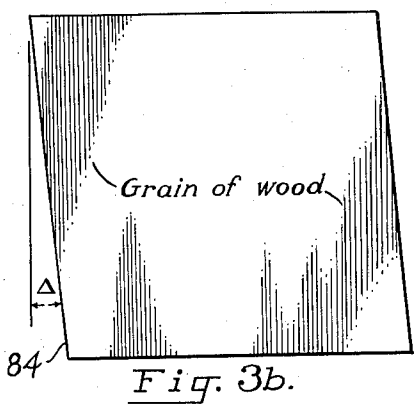


Fig. 3b.

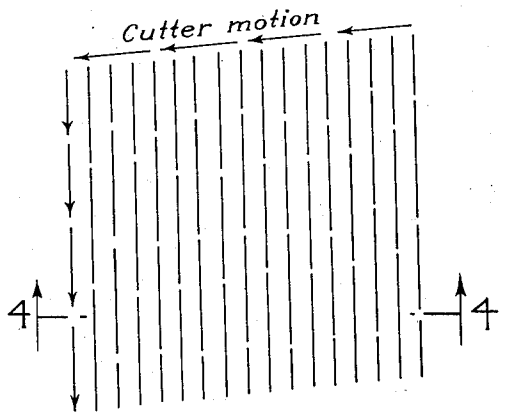


Fig. 2a. Cutters parallel to wood travel

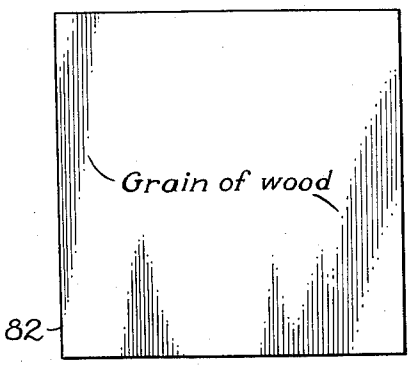


Fig. 3a.

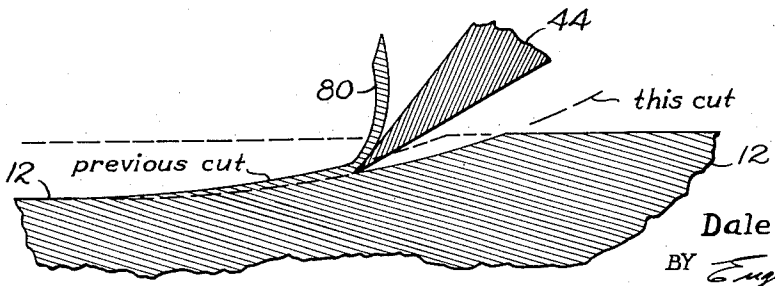


Fig. 4.

INVENTOR
Dale L. Schubert
BY Eugene D. Farley
Atty.

United States Patent Office 2,898,958 Patented Aug. 11, 1959

2,898,958

METHOD OF MAKING CROSSCUT WOOD FLAKES AND SAWMILL CROSS GRAIN FLAKING PLANER THEREFOR

Dale L. Schubert, Tacoma, Wash., assignor, by mesne assignments, of one-half to Industrial Development Co., Tacoma, Wash., a corporation of Washington

Application August 16, 1957, Serial No. 678,651

5 Claims. (Cl. 144—172)

This invention relates to method and apparatus for making crosscut wood flakes. It pertains particularly to a sawmill cross grain flaking planer for use in planing rough lumber to produce cross cut flakes rather than the long cut shavings produced by the operation of a conventional sawmill planer.

In the manufacture of hardboard and other pressed composition products by consolidating a mixture of small pieces of wood and adhesive, it has been found that superior strength qualities are imparted to the product when the wood pieces are in the form of crosscut wood flakes. Such flakes are produced by cutting wood across the grain, as opposed to along the grain, with the plane of the cutting edge substantially parallel to the grain direction and the cutting traverse substantially normal thereto. Fakes of this category are not produced in conventional planer mill operation since, in the normal operation of such mills, the lumber is fed endwise against a planer head, the knives of which are stationed with their cutting edges perpendicular to the grain and the cutting traverse of which is along the grain.

Accordingly, in the operation of such units, long-cut rather than crosscut flakes or shavings are produced and as a result, the wood removed from lumber in sawmill planing operations is completely lost as a valuable potential source of crosscut flakes.

It is the general object of the present invention to provide method and apparatus for producing crosscut wood flakes suitable for application in the production of hardboard and other composition wood products from rough lumber while contemporaneously planing the surface of the lumber to produce a smooth-surfaced, finished product of commercial dimensions, without making major changes in the routine or layout of a conventional lumber planing mill.

The manner in which the foregoing and other objects of this invention are accomplished will be apparent from the accompanying specification and claims considered together with the drawings wherein like numerals of reference indicate like parts, and wherein:

Fig. 1 is a plan view of sawmill cross grain planing apparatus which may be employed in the practice of the presently described invention;

Figs. 2*a* and 2*b* are composite schematic illustrations with a vector diagram of the action of the planing apparatus of Fig. 1 (*a*) when the cutters of the planer are arranged parallel to the direction of wood travel; and (*b*) when the cutters of the apparatus are arranged parallel to the axis of the cutter head;

Figs. 3*a* and 3*b* are plan views of cross grain wood flakes produced respectively by the action of cutters arranged as illustrated in Figs. 2*a* and 2*b*;

Fig. 4 is a sectional view of a board being planed with a cross grain cutter looking in the direction of line 4—4 of Fig. 2*a* and illustrating the cross cutting action of the cutter in producing the herein described cross cut wood flakes; and

Fig. 5 is a plan view illustrating a modified form of cutter head wherein the cutters are arranged in spiral rows thereon.

Generally stated, the presently described method of producing crosscut wood flakes comprises positioning a cutter with its longitudinal axis at an angle of less than 45° relative to the longitudinal center line of a piece of lumber, feeding the lumber longitudinally against the cutter, and controlling the cutter speed relative to the feed speed of the lumber until the resultant cutting path of the cutter is substantially at right angles to the grain direction of the wood, thereby planing crosscut flakes from the wood surface.

The apparatus employed for effectuating the foregoing method broadly comprises conveying means for conveying pieces of lumber in an endwise direction, cutting means, means for positioning the cutting means at an angle of less than 45° relative to the longitudinal center line of the lumber, the cutter being in planing engagement with the lumber, and means for controlling the cutter speed relative to the feed speed of the lumber until the resultant cutting path of the cutter is substantially at right angles to the grain direction of the wood.

Considering the foregoing in greater detail and with particular reference to the drawings:

A planing table such as is found in the conventional lumber mill is indicated at **10**. Pieces of lumber **12** are fed along the table by suitable drive means such as spaced live rolls **14, 16** journaled respectively in bearings **18, 20** and driven by a variable speed motor **21** operating through conventional control means **23**. The live rolls thus may be driven at varying rotational speeds.

The planing assembly employed for planing the surface of boards **12** is located above table **10** in the space between feed rolls **14, 16**. It is mounted on a platform **22** supported rotatably on a post **24** and is provided with spaced arcuate slots **26, 28** which are concentric with the post.

The planer is driven by a variable speed motor **30** which is mounted on the platform and the shaft of which is fitted with pulley **32**. Motor **30** operates through conventional control means **31**. The pulley **32** drives belt **34** which, in turn, drives pulley **36** on the shaft **38** of a rotary planing head. Shaft **38** is journaled in bearings **40** which are bolted to a vertical support member **41** carried by and extending upwardly from that margin of plate **22** which is adjacent the travel path of boards **12**. Cutter head or planing head **42** is supported by the shaft.

This head carries a plurality of rows of knives **44** having a length predetermined to cut flakes or wafers of the desired width and arranged either parallel to the longitudinal axis of the cutter head, as illustrated in Fig. 1, or in a spiral relation as illustrated in Fig. 5, the head and knives in the latter view being designated by the numerals **42***a* and **44***a*, respectively. The knives may be separated by conventional scoring elements, not illustrated, which cut across the wood so that the flakes are formed with clean, sharp edges.

Means are provided for carrying away the flakes produced by the planer head. Such means in the illustrated form comprise a vacuum hood **48** supported by brackets **50** on hearings **40**. Vacuum hood **48** communicates with a conduit **52** which in turn connects with an exhaust fan, not illustrated, of sufficient capacity to create an air flow adequate to collect and convey away the flakes produced by the planer head.

It is to be noted that the longitudinal axis of planer head **42** lies at an acute angle with respect to the longitudinal center lines of lumber pieces **12**. This angle is adjustable. To this end, a horizontal screw **54** having an integral nut **56** on its outer end is rotatably mounted in a

bearing **58** carried by swiveling post **60**, a lock collar **62** being placed on the screw adjacent the bearing. Screw **54** also penetrates an internally threaded member **64** which may comprise a stepped projection of a swivel post **66**.

Operation of screw **54** imparts to table **22** and planer head **42** carried thereby an angular movement about post **24**. When the planer head has been placed in its desired position relative to lumber pieces **12**, it may be locked securely in place by tightening lock collar **62** as well as nuts **68, 70** on bolts **72, 74** which extend upwardly from table **10** and penetrate arcuate slots **26, 28**, respectively.

The angle of adjustment of planer head **42** and the knives thereon relative to boards **12** is determined by a number of factors including the rate of travel of the boards, the rotational speed of the planer head, the width of the boards and the length of the planer head. In general, however, this angle is more than 1° and less than 45°, preferably more than 1° and less than 20° for practical plant operation.

The knife angle, and other indicated variables are adjusted so that the cutting action illustrated in Figs. 2–4 occurs when the planer head is rotated and boards **12** are fed endwise against it. As indicated in Fig. 4, the knives **44** bite into the surface of the wood to a predetermined depth and cut out flakes **80** with a cross cutting action.

Where the edges of the cutter are strictly parallel to the grain direction of the wood, as they may be when they are spiralled about cutter head **42** at an angle correlated with the angle between the cutter head and the grain of the wood, strictly rectangular flakes such as those illustrated at **82** in Fig. 3*a* can be produced. However, when the cutter surfaces are parallel to the longitudinal axis of the cutter, as shown in Fig. 1, and accordingly lie at a slight angle to the grain of the wood, flakes such as are illustrated at **84** in Fig. 3*b* are produced. These also are cross cut flakes, but are not strictly rectangular in outline.

The manner in which this result is achieved is apparent from a consideration of Figs. 2*a* and 2*b*. By correlating the speed of travel of the boards, the rotational speed of the cutter, and the angle at which the cutter lies relative to the axis of the cutter head, it is possible to produce a knife travel vector **86** and a board travel vector **88** of lengths such that the resultant vector **90** for the cut lies at substantially 90° to the grain direction of the wood. The flakes produced thus are truly cross cut or cross grain, but where the cutters are parallel to the axis of the cutter head, as shown in Fig. 1, the side edges of the flakes will depart from strictly rectangular by an angle Δ determined by the angle between the knife travel vector and the resultant vector for the cut.

Furthermore, by substituting one cutter head embodiment for the other while using the same settings of speed control for the feed of the lumber and for the rotation of the cutter head, the shape of the flakes may be changed from non-rectangular to rectangular or vice versa. That is, after setting the apparatus to produce rectangular flakes, as shown in Fig. 3*a*, merely substituting the other cutter head embodiment while leaving the controls alone will result in the production of non-rectangular flakes of the shape shown in Fig. 3*b*.

Hence by the present invention it is possible to produce cross cut flakes useful in the manufacture of hardboard and other composition wood products while contemporaneously planing the surface of lumber in a practical sawmill operation. A valuable flake product accordingly is produced, rather than shavings of little or no value such as are produced by the conventional sawmill planer. The planing operation may be carried out in such a manner that the boards have a smooth, finished surface and are ready for sale in the usual markets as produced, or after being further finished by a conventional planer or sander set to take a very light cut. These outstanding advantages are obtained, furthermore, by means of apparatus which may be installed in a conventional sawmill without extensive revision of the plant flow plan or the installation of elaborate and expensive machinery.

It is to be understood that the form of my invention herein shown and described is to be taken as a preferred example of the same and that various changes in the shape, size and arrangement of parts may be resorted to without departing from the spirit of the invention or the scope of the subjoined claims.

Having thus described the invention, I claim:

1. The method of producing cross cut wood flakes which comprises positioning a rotary cutter with its longitudinal axis at an angle of more than 1° but less than 45° relative to the grain direction of a piece of lumber, feeding the lumber longitudinally against the cutter, and controlling the cutter speed relative to the feed speed of the lumber until the resulting cutting path is substantially at right angles to the grain direction of the wood, thereby planing cross cut flakes from the wood surface.

2. The method of claim 1 wherein the position of the cutter relative to the wood grain direction is set at an angle of more than 1° but less than 20°

3. Apparatus for planing cross cut wood flakes from the surface of rough lumber which comprises conveying means for conveying lumber in an endwise direction along a predetermined travel path, cutting means stationed adjacent and in cutting engagement with the lumber, the angle of the cutting surfaces of the cutting means being more than 1° but less than 45° with respect to the grain direction of the lumber, and means associated with the lumber feed means and the cutter means for controlling the relative speeds thereof until the resultant path of the cutter is substantially at right angles to the wood grain direction.

4. The apparatus of claim 3 including means for adjusting the angle of the cutter relative to the lumber.

5. The apparatus of claim 3 including vacuum exhaust means associated with the cutter for exhausting the cross cut flakes as they are produced.

References Cited in the file of this patent

UNITED STATES PATENTS

2,776,686	Clark (2)	Jan. 8, 1957
2,776,687	Clark (1)	Jan. 8, 1957

FOREIGN PATENTS

7,705	Great Britain	1889