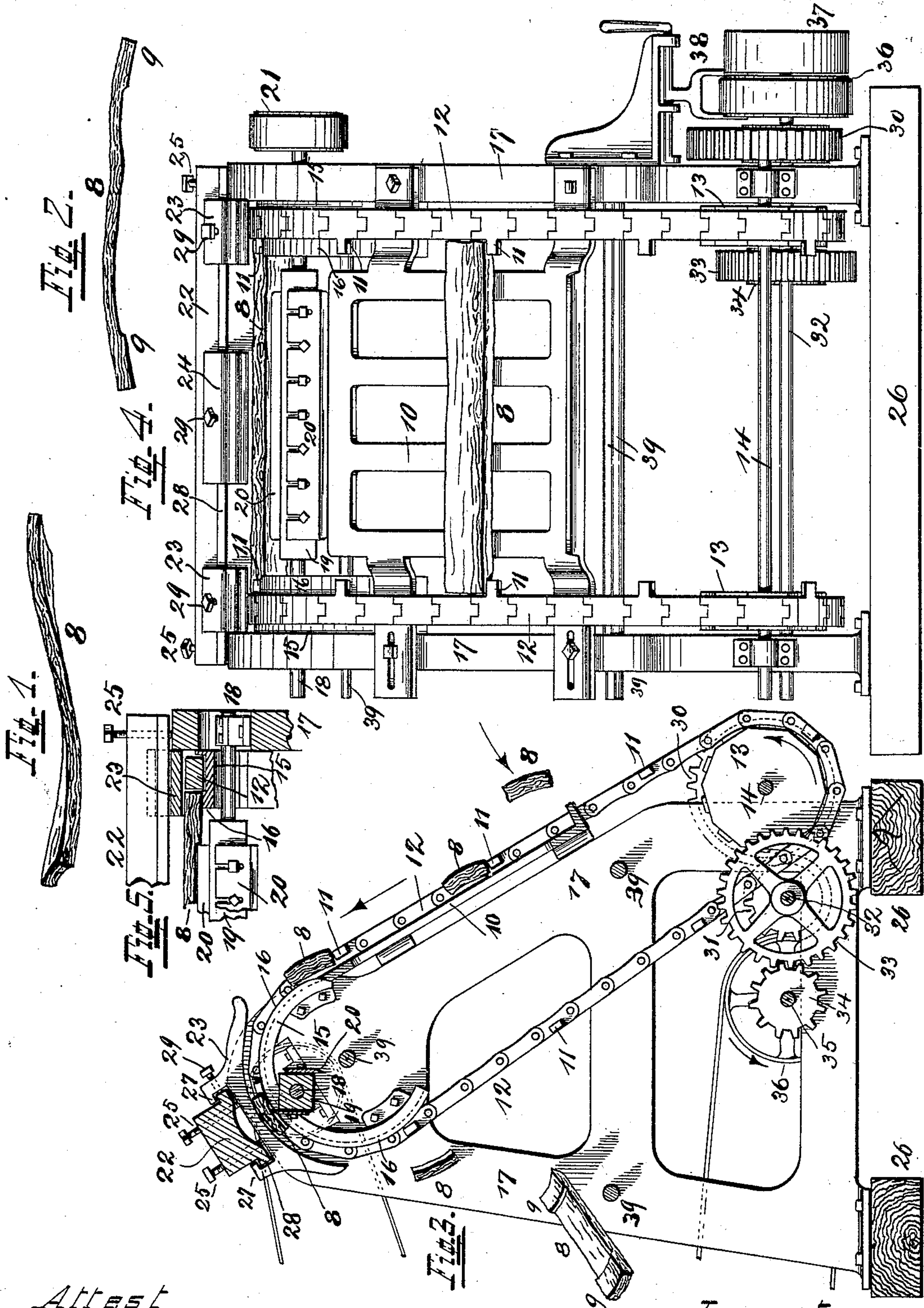


(No Model.)

D. F. MILLER.  
MACHINE FOR FINISHING TWISTED STAVES.

No. 509,233.

Patented Nov. 21, 1893.



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# UNITED STATES PATENT OFFICE.

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## MACHINE FOR FINISHING TWISTED STAVES.

SPECIFICATION forming part of Letters Patent No. 509,233, dated November 21, 1893.

Application filed August 14, 1893. Serial No. 483,046. (No model.)

*To all whom it may concern:*

Be it known that I, DANIEL F. MILLER, a citizen of the United States, and a resident of Somerset, Pulaski county, State of Kentucky, have invented a certain new and useful Machine for Finishing Twisted Staves; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, attention being called to the accompanying drawings, with the reference-numerals marked thereon, which form a part of this specification.

This invention relates to one of a class of machines used for dressing and shaping staves, such as are required in the manufacture of kegs, barrels and other similar cooperage. Staves of this kind are dressed on both sides, they are curved on a line which corresponds with the periphery of the particular size of the vessel for which they are intended and finally they are cut out between the ends to facilitate their bending, the thicker portions remaining being needed to obtain the required thickness to permit the croze or groove to be cut in which receives the heads. These different attributes are imparted to the staves by various methods and machines. Some of these latter do all the required work at once, while others do only a part of it and in which latter case the staves have to be operated upon repeatedly.

My invention relates to that class of machines which cut out the staves between their ends, the dressing and curving being done previously by other machines, mostly by so-called stave-buckers. In these last named machines the staves are forced end-wise through between two knives set so close together that the former are at once dressed and reduced to their proper thickness, receiving at the same time the required curve by reason of a corresponding curve in the knives. The particular manner in which the knives of these machines act upon the wood, causes the cut to follow the grain, so that the staves assume all the irregularities and twists of the wood, while otherwise having the proper thickness and curvature. The finishing of such twisted staves, that is the reduction of

the thickness between their ends is rather difficult and in fact impossible with ordinary stave-dressing machines for the reason that some parts of the irregular staves will be closer to the knives of the cutterhead, while others will be farther away or perhaps altogether out of reach. This results in an uneven reduction of the staves, which by reason of the excessive loss on some parts become so thin and weakened as to be useless. No attempt is therefore made to pass such staves through a stave-dresser, or finisher, and they are at once thrown aside, either as waste, or to be worked by hand. Either disposal is of course objectionable. The one is a total loss, while the other adds to the expenses the difference between hand-labor and machine work. To overcome these objections and to make it possible to finish such irregular staves by machinery, special machines have been devised and my invention relates therefore more particularly to machines for finishing such twisted staves. While the machine which exemplifies my invention is constructed with a view to adapt it to do such special work, it is not limited thereto and takes the regularly formed staves equally as well. It should be understood that such irregular or twisted staves, if properly finished, may equally as well be used for cooperage as the straight ones, because all staves, before set up for kegs, or barrels, pass through a bending-process which corrects all irregularities.

In the following specification and particularly pointed out in the claims, is found a full description of my invention, its parts, operation, and construction, the latter being also illustrated in the accompanying drawings, in which—

Figures 1, and 2, show two forms of twisted, or irregular staves, the latter one as it appears after being finished. Fig. 3, is a vertical cross-section of the machine and Fig. 4, is an elevation of the same. Fig. 5, is a sectional detail-view.

8, are the staves and when received by this machine are in a condition as shown in Fig. 1, that is they are dressed on both sides and curved transversely.

The finishing which this machine is to do,



consists of reducing the thickness of the staves midway, whereby the thicker ends 9, are produced, as shown in Fig. 2. For this purpose, the staves are placed upon a feed-table 10, from which they are taken by two fingers 11, projecting inwardly opposite each other from two endless feed-chains 12. These chains are driven by two sprocket-wheels 13, on a shaft 14 around which they pass below and at their other end they pass around curved guides 15, provided with flanges 16, to confine the chains in position thereon. The curve of these guides corresponds with the one of the staves, being a part of the circle which constitutes the periphery of the vessel for which the staves are intended. They are secured in a suitable manner to the inside of the two frame-sections 17, 17, by which all parts of this machine are supported.

Below the guides and supported in bearings on the frame-sections is a shaft 18, which carries a cutter-head 19, with knives 20, and is rotated by a suitable belt-pulley 21. The knives 20, are set out far enough to produce the required reduction in the thickness of the staves and are shorter than these latter to leave their ends intact.

Above guides 15, and supported on a beam 22, which rests on top of the frame sections, reaching from one to the other, are what may be termed curbs 23, the office of which is to hold, while the knives act upon them, the staves in position on the inner one of the flanges 16, of guides 15, on which the staves travel after leaving the feed-table. Excepting near the front-end, the under-surfaces of these curbs, which come in contact with the staves, are concentric with the guides and their flanges and extend sufficiently forward and rearward of the cutter-head, to secure a complete hold for the staves during the time they are passing within reach of the knives. The distance, or space between the concentric surfaces of these curbs and the guides below, through which the ends of the staves pass, corresponds with the thickness of these latter and the curbs and guides being exactly in the same position and at the same height opposite each other, it follows that the ends of the staves must assume a similar position while passing through this space. A straight stave with its ends in line, while passing through this space will be held by the curbs in position on the flanges of the guides and on fingers 11, during the finishing process. On a twisted stave, with its ends not in line, the action will be similar as far as holding in position is concerned, but in addition to that, the stave will be temporarily straightened and its ends brought into line with each other and held so by the guides and curbs on each side. This enables the knives of the cutter-head to reach evenly into the wood at all points of the stave, whereby the reduction becomes equal, which otherwise would not be the case. The front-ends of these curbs where the staves pass first under, are not concentric with the

guides below but turned up as shown, to facilitate the passing under of irregular staves. An additional device or curb 24, similar to the ones indicated by 23, is provided midway between these others and supported in the same manner. It assists the others in their action and also serves to hold the middle part of the staves down against the knives in cases where they are of a shape as shown in Fig. 2. By means of screws 25, beam 22, may be raised or lowered on the frame-sections 17, whereby the curbs supported thereon are similarly affected and the space between these latter and the guides is adjusted to conform to the thickness of the staves.

To adjust the machine for the different lengths of staves, it is my intention to move one of the frame-sections, preferably the left one out or in on the sills 26, supporting them. This carries the adjacent one of the feed-chains with it and the space between them is accordingly regulated. Knives of different lengths may be attached to the cutter-head to adjust the part of the stave to be reduced correspondingly. The curbs have flanges 27, whereby they rest on flanges 28, of beam 22, and are capable of sliding thereon for lateral adjustment in cases where the frame is moved to change the width of the machine. They are provided with set-screws 29, to hold them in position.

The feed-chains may be driven in any suitable manner. In this case shaft 14, carries a gear-wheel 30, which is driven by a pinion 31, on a shaft 32. This latter has a gear-wheel 33, and is driven by a pinion 34, on a shaft 35. A belt-pulley 36, transmits the power from the motor.

37, is a loose pulley and 38, a belt-shifter whereby the feed-mechanism may be stopped.

39, are tie-rods, passing from one frame-section to the other for the purpose of increasing the stability of the machine.

Having described my invention, I claim as new—

1. In a machine for finishing twisted staves, the combination of two inclined endless feed-chains parallel with each other lateral projections 11, on them which elevate the staves and support them between the chains, means to actuate these latter, a feed-table curved, guides 15, around which the chains draw the staves the ends of which rest on these guides, a rotary cutter-head below the guides and means to hold the staves to guides 15 while passing within reach of the cutter-head.

2. In a machine for finishing twisted staves, the combination of two inclined endless feed-chains, parallel with each other, means to actuate them, a feed-table between them on which the staves are deposited, curved guides 15, with flanges 16, over which the ends of the staves, pass lateral projections 11, on these chains on which between these latter the staves are carried from the feed-table to and around flanges 16 on which the ends of the staves rest, curbs 23, which hold the ends of



the staves to these flanges and a rotary cutter-head below them.

3. In a machine for finishing twisted staves, the combination of two inclined endless feed-chains, parallel with each other, means to actuate them, a feed-table between them on which the staves are deposited, guides 15, with flanges 16, over which the ends of the staves pass, projections 11, on these chains which carry the staves from the feed-table to and around flanges 16, curbs 23, which hold the ends of the staves to these flanges, a rotary

cutter-head below them, an additional curb between the others to hold the middle-portion of the staves down to within reach of the knives of the cutter-head and a beam 22, on which these curbs are supported.

In testimony whereof I affix my signature in presence of two witnesses.

DANIEL F. MILLER.

Witnesses:

J. E. GIRDLIN,  
JOHN INMAN.