

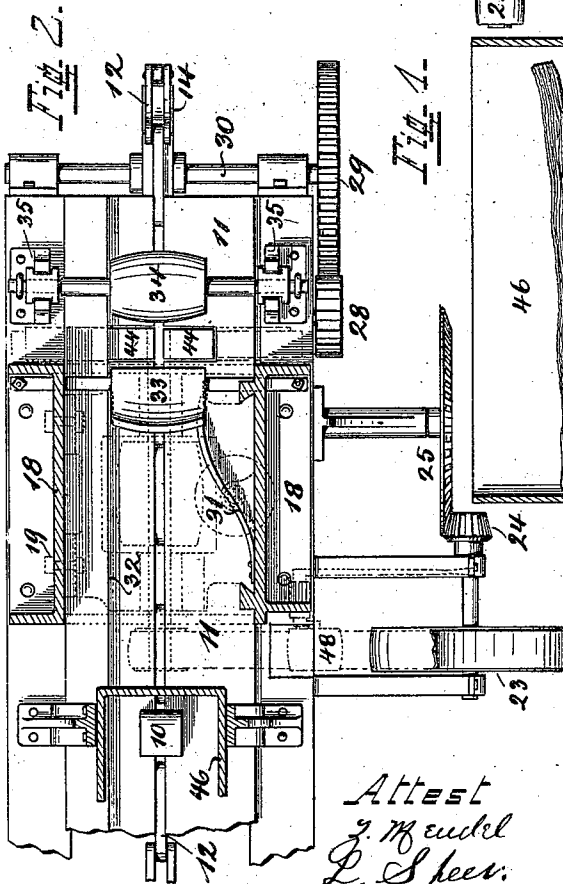
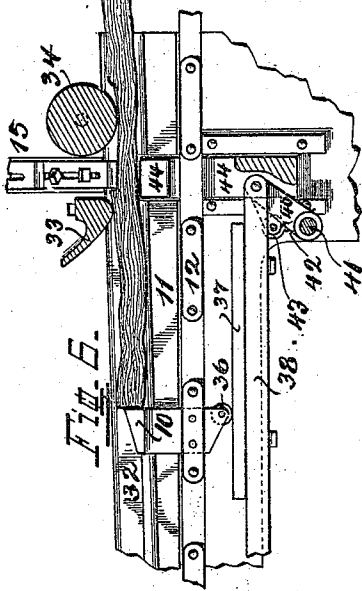
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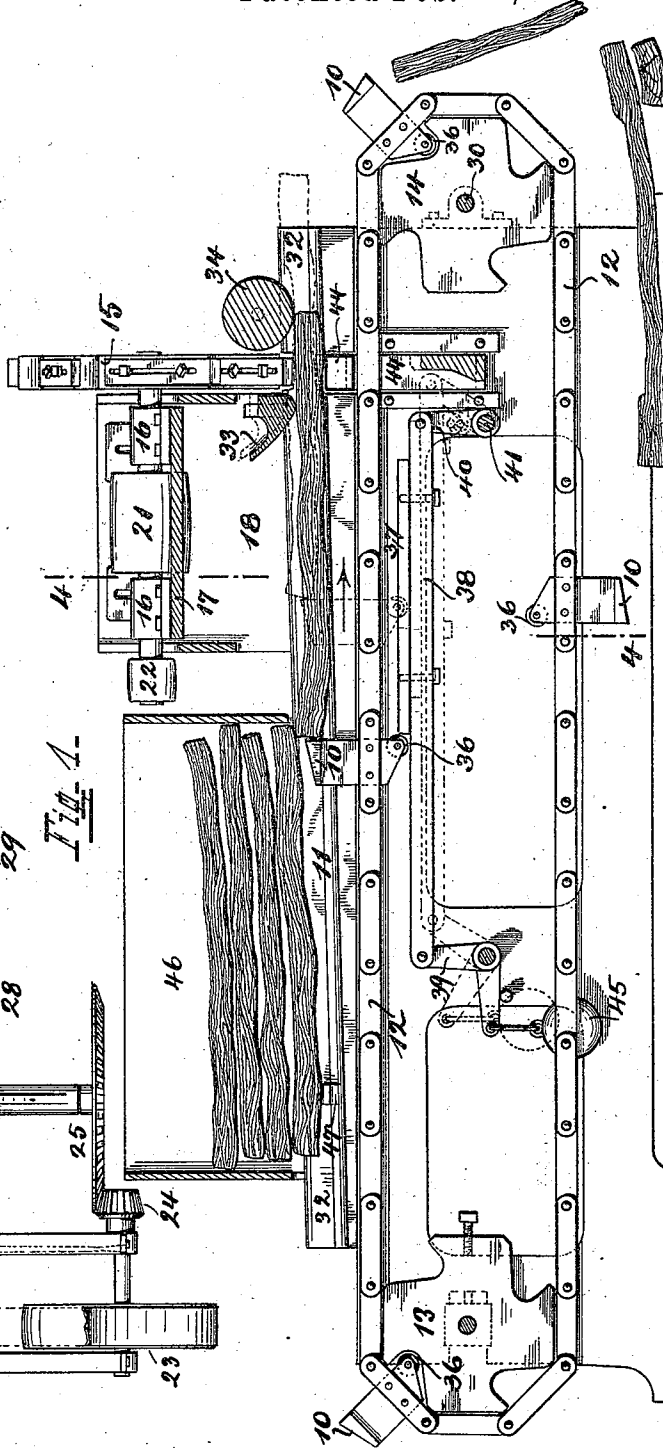
W. A. GREAVES.
MACHINE FOR FINISHING STAVES.

No. 554,676.

Patented Feb. 18, 1896.



Attest
J. M. Endel
L. S. Speer.



Inventor
William A. Greaves
by C. Spengel Atty.

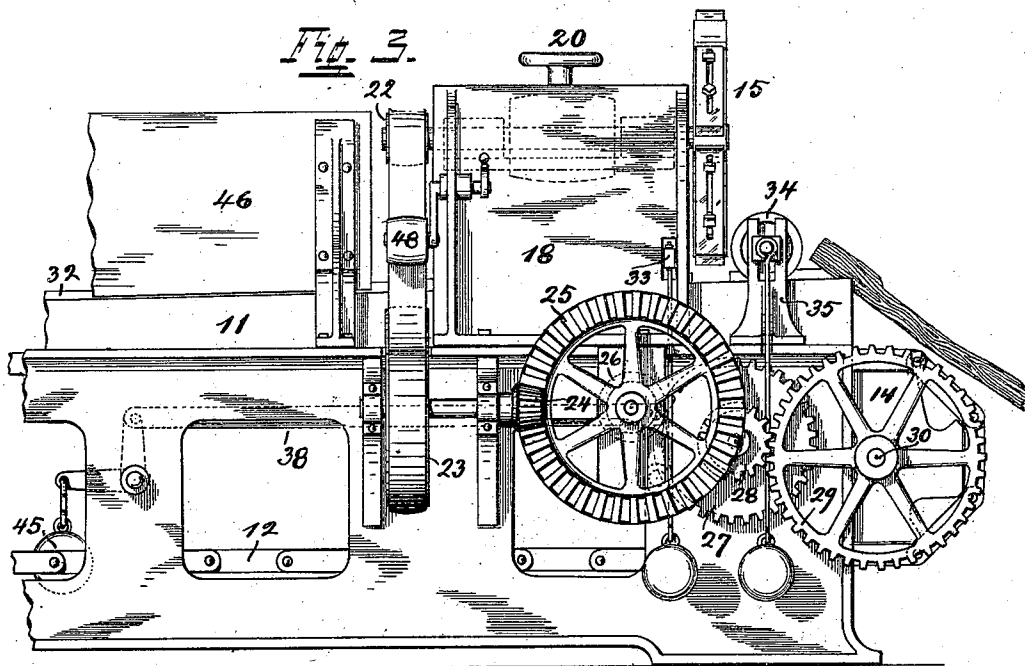
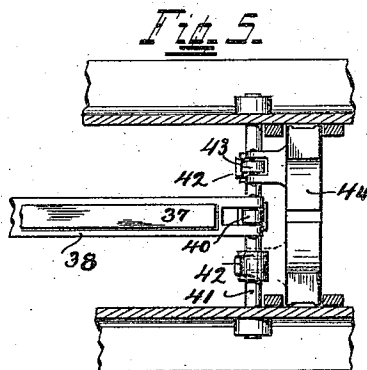
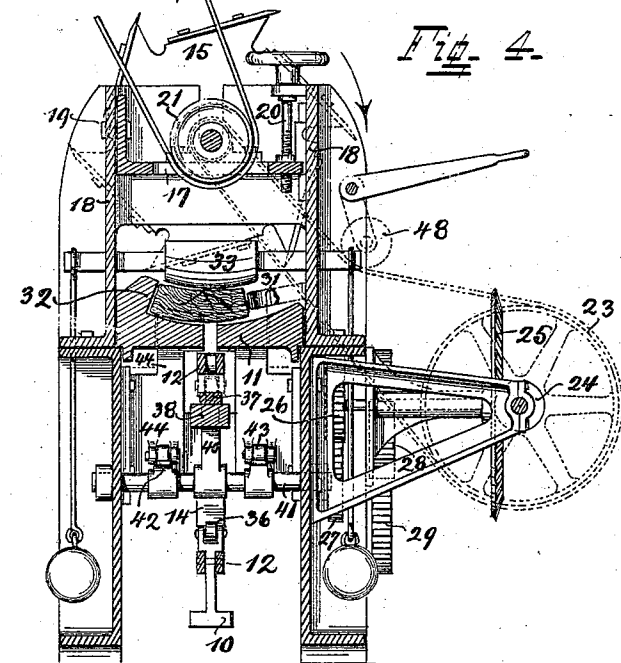
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UNITED STATES PATENT OFFICE.

WILLIAM A. GREAVES, OF HYDE PARK, OHIO.

MACHINE FOR FINISHING STAVES.

SPECIFICATION forming part of Letters Patent No. 554,676, dated February 18, 1896.

Application filed April 29, 1895. Serial No. 547,468. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM A. GREAVES, a citizen of the United States, and a resident of Hyde Park, Hamilton county, State of Ohio, have invented a new and useful Machine for Finishing 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 a class of machines for dressing and shaping staves used in the manufacture of kegs, barrels, and other similar cooperage. Staves of this kind are dressed on both sides and curved on a line which corresponds with the periphery of the particular diameter of the vessel for which they are intended, and finally they are cut out between the ends to facilitate their bending, the thicker end 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 cases the staves have to be operated upon repeatedly.

My invention relates to that class of machines which cut out, dress, and curve the staves between their ends, the dressing and curving of the other parts being done previously by other machines, mostly by so-called "stave-buckers." In these last-named machines the staves are forced endwise 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 peripheral curve by reason of a corresponding curve in the knives. The particular manner in which the knives of these stave-buckers act upon the wood causes the cut to follow the grain, and if said wood is irregular the staves assume and retain such irregularities, bends, and twists, while otherwise having the proper thickness and curvature. The reduction of thickness of these irregular staves by hollowing them out between the ends, commonly called their

"finishing," is rather difficult, and in fact impossible with many stave-dressing machines, for the reason that some parts of the irregular staves will be closer to the knives of the cutter-head, 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. To overcome this objection is the object of my invention, which relates therefore more particularly to a machine which in addition to finishing the straight staves is also adapted to finish them in all the various irregular shapes in which they may come. It should be understood that irregular-shaped staves, if properly finished, may equally as well be used for cooperage as straight ones, because all staves before set up in kegs or barrels pass through a bending process, which corrects such 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—

Figure 1 is a longitudinal vertical section with a stave in position to be presently acted upon by the cutter-head. Fig. 2 is a top view and horizontal section of the rear part of the machine, the line of section passing above the feed-trough and below the cutter-head. Fig. 3 is a side elevation of this part of the machine shown in the preceding figure. Fig. 4 is a vertical section on line 4 4 of Fig. 1. Fig. 5 is a detail view of parts of Fig. 2, showing a detached top view of the reciprocating stave-support shown in said figure. Fig. 6 is a detail view of parts of Fig. 1, illustrating the reciprocating stave-support shown therein and the means for operating it in its elevated position.

In the drawings, 10 are feed-dogs secured by shanks which reach through a central slot of a feed-trough 11 to an endless feed-chain 12, passing over guide-pulleys 13 and 14. Above the feed-trough near its rear end is the cutter-head 15, its shaft revolving in bearings 16 supported on a frame 17, which is vertically adjustable within another frame 18 by means of bolts 19 and an adjusting-screw 20.

The cutter-head shaft is driven by a pulley 21 and has at its end another pulley 22, connected by a belt to a pulley 23, which by bevel-gearing 24 25 and intermediate gearing 26, 27, 28, and 29 to reduce speed drives the shaft 30, which supports guide-pulley 14 of the feed-chain. By thus making the motion of the feed mechanism dependent on the motion of the cutter-head shaft the proper proportion of the two speeds is always maintained, and if the speed of the cutter-head is retarded when cutting through hard wood the speed of the feed-chain is likewise affected. The advancing stave, carried forward by one of the feed-dogs, encounters first a lateral spring or weight operated pressure-bar 31, whereby the stave is caused to lie against and follow a shoulder 32, raised lengthwise throughout the feed-trough. Next it passes under a preferably weight-operated pressure-bar 33, supported in the sides of frame 18, by which bar the stave is guided under the cutter-head. Back of the latter the stave passes under a pressure-roller 34, supported in stand-ards 35, which roller, in conjunction with pressure-bars 33 31 and shoulder 32, holds the stave in position while acted upon by the knives of the cutter-head. As shown in Fig. 1, one end of the stave has already passed under the cutter-head but beyond reach of the latter, and not yet having been touched by its knives, in order to leave the end of the stave intact. In the further progress of the feed-chain the downwardly-extended shanks of dogs 10, or equivalent projections, also secured to the feed-chain and preferably provided with rollers 36 to reduce friction, strike against the end of a pattern-bar 37 connected to a link 38, supported on pivoted arms 39 and 40. The first effect of this contact is a horizontal movement of bar 37 and link 38, which thereby swings arms 39 and 40, rotating also partially the shafts to which these arms are connected. One of the latter (designated by 41) has connected to it cams 42, the projecting part of which passes under rollers 43 and raises a stave-support 44, to which these rollers are connected. (See Fig. 6 and dotted lines in Fig. 1.) This stave-support is properly guided and in its upper part cut out to permit the feed-chain and dogs thereon to pass, while its upper end before the raising, as just described, is flush with the level of the feed-trough. When so raised, the support elevates the stave against the knives of the cutter-head and the latter commences now to act upon the stave for the purpose of reducing its thickness.

The longitudinal movement of bar 37 and link 38 is also accompanied by a vertical depression by reason of the ends of arms 39 and 40 to which link 38 connects describing, while swinging, a circular line. Roller 36 continues to act against the end of bar 37 until this latter has become so much lowered as to pass beyond the action of the roller, which now rides over the top of the bar, at which moment

the longitudinal movement of the latter necessarily ceases and the stave-support is held in its raised position with the stave elevated on its upper end. The latter being supported only to a limited extent and its ends being free to adjust themselves if irregular passes through between cutter-head and support with a more or less wriggling or undulating motion. The distance between the top of the stave-support and the cutting-line of the knives being regulated and fixed for the time being, all parts of the stave while passing through between them are reduced to an equal thickness. In due time, but before the other end of the stave is reached, roller 36 passes off from bar 37, permitting the same to return to its normal position by means of a weight 45, and also dropping the stave-support. As a consequence the stave drops with it and being then again below the reach of the knives retains its full thickness at the end. The time during which the cutter-head acts upon the stave being dependent on the length of bar 37, it is obvious that if this length is varied by substitution of other shorter or longer bars the length of the cut-out portion of the stave is also adjusted as may be required for shorter or longer staves. The feed-trough rises toward the cutter-head with reference to the feed-chain and to the line in which dogs 10 travel. The latter project therefore first to a greater height and prevent the stave while adjusting itself from becoming disengaged therefrom when first passing under the pressure devices, at which time its motions are most impetuous. In the further progress the motions of the stave become less agitated, the projection of dogs 10 gradually diminishes and they clear the cutter-head in ample safety. In due time the stave drops off by its own weight as soon as passed out from under pressure-roller 34. As will be seen, the same mechanism which feeds the stave forward also acts upon it for the purpose of raising it into the knives, which permits the most perfect and accurate adjustment as to the time when the knives should begin and cease to act. To thus use the feed mechanism to operate other mechanism which controls the action of the knives of the cutter-head on the wood is a very important feature, obviating all irregularities arising from the difficulty of maintaining a proper adjustment under different speeds by reason of being positive and dependent only on the one speed of the feed mechanism. The raising and lowering of the cutter-head for the purpose of cutting may also be controlled in this manner where the latter is made to reciprocate instead of the adjustable stave-support.

It is not necessary that rollers 36 should be connected to the downwardly-extended dogs. There may be independent projections secured to the chain, but as to number and distance between them they must correspond with the dogs.

To facilitate feeding I provide a hopper 46,

which may be supplied with a number of staves at once, which then are taken one by one from underneath by the dogs as they pass through the lower part of the hopper. On account of the inclination of top 11 a support 47 for the staves should be provided within the hopper.

48 is an idler-pulley and belt-tightener, whereby when raised the feed mechanism may be stopped whenever required.

It is hardly necessary to mention that where the ends of the staves have not previously been reduced to the proper thickness the action of the cutter-head may be extended and as a matter of fact would extend to them, and thus finish the inner sides of the staves throughout their entire length in addition to hollowing them out between their ends.

Having described my invention, I claim as new—

1. In a machine for finishing staves, the combination of a cutter-head, a feed-trough, a stave-support, a feed-chain adapted to feed staves to the cutter-head, projections on the feed-chain and mechanism operated by said projections in a manner to change at certain intervals the distance between the knives of the cutter-head and the stave-support.

2. In a machine for finishing staves, the combination of a cutter-head, a feed-trough, a stave-support located therein below the cutter-head, and adjustable to and from the latter, a feed-chain adapted to feed and pass staves through between the cutter-head and stave-support, projections on the feed-chain and intermediate mechanism operated by said projections in a manner to raise at certain intervals the adjustable stave-support.

3. In a machine for finishing staves, the combination of a cutter-head, a feed-trough, a stave-support located therein below the cutter-head and adjustable to and from the latter, a feed-chain adapted to feed and pass staves through between the cutter-head and stave-support, projections on the feed-chain and a pattern-bar 37, normally located in the path of said projections and operatively connected to the stave-support.

4. In a machine for finishing staves, the combination of a cutter-head, a feed-trough, a stave-support located therein below the cutter-head and adjustable to and from the latter, a feed-chain adapted to feed and pass staves through between the cutter-head and stave-support, projections on the feed-chain, a pattern-bar 37 normally located in the path of said projections and supported on a link 38, pivoted arms 39 and 40 which support said link 38, rock-shafts on which they swing and cams 42 on one of the latter for the purpose of operating the stave-support.

5. In a machine for finishing staves, the combination of a rigidly-supported feed-trough, an endless feed-chain with dogs 10 to advance staves over it supported below the center thereof and a cutter-head supported above the feed-trough near one end thereof, said feed-

trough gradually rising toward the cutter-head with reference to the feed-chain and having a central longitudinal slot to permit dogs 10 to pass.

6. In a machine for finishing staves, the combination of a rigidly-supported feed-trough, an endless feed-chain with dogs 10 to advance staves over it supported below the center thereof, a cutter-head supported above the feed-trough near one end thereof, said feed-trough gradually rising toward the cutter-head with reference to the feed-chain and having a central longitudinal slot to permit dogs 10 to pass, and a shoulder 32 running lengthwise through it to guide the staves and hold them in position against the action of the cutting-knives.

7. In a machine for finishing staves, the combination of a rigidly-supported feed-trough, an endless feed-chain with dogs 10 to advance staves over it supported below the center thereof, a cutter-head supported above the feed-trough near one end thereof, said feed-trough gradually rising toward the cutter-head with reference to the feed-chain and having a central longitudinal slot to permit dogs 10 to pass, a shoulder 32 running lengthwise through it and a self-adjusting pressure-bar 31 which holds the staves against it.

8. In a machine for finishing staves, the combination of a rigidly-supported feed-trough, an endless feed-chain adapted to advance staves over it supported below the center thereof, a cutter-head supported above the feed-trough and a stave-support therein below and in line with the cutter-head, adjustable to and from the latter, said stave-support cut out to permit the feed-chain to pass.

9. In a machine for finishing staves, the combination of a rigidly-supported feed-trough, an endless feed-chain adapted to advance staves over it, a cutter-head supported above the feed-trough near one end thereof, said feed-trough gradually rising toward the cutter-head with reference to the feed-chain and an adjustable stave-support in the feed-trough and below and in line with the cutter-head.

10. In a machine for finishing staves, the combination of a cutter-head, a feed-trough, an adjustable stave-support located in the latter and below the cutter-head, pressure devices at either side of the latter to hold the stave down on its support, a feed-chain adapted to feed and pass staves through between the cutter-head and stave-support, projections on the feed-chain and intermediate mechanism operated by said projections in a manner to raise at certain intervals the adjustable stave-support.

11. In a machine for finishing staves, the combination of a rigidly-supported feed-trough, an endless feed-chain with dogs 10 to advance staves over it supported below the center thereof, a cutter-head supported above the feed-trough near one end thereof, said feed-trough gradually rising toward the cut-

ter-head with reference to the feed-chain and having a central longitudinal slot to permit dogs 10 to pass, an adjustable stave-support in the feed-trough and below the cutter-head 5 and pressure devices at either side of the latter to hold the stave down on its support.

12. In a machine for finishing staves, the combination of a rigidly-supported feed-trough, an endless feed-chain with dogs 10 to 10 advance staves over it supported below the center thereof, a cutter-head supported above the feed-trough near one end thereof, said feed-trough gradually rising toward the cutter-head with reference to the feed-chain and 15 having a central longitudinal slot to permit dogs 10 to pass and pressure devices at either side of the cutter-head to hold the staves in position while being acted upon by the knives.

13. In a machine for finishing staves, the 20 combination of a cutter-head, an inclined rigidly-supported feed-trough, a feed-chain with dogs 10 to advance staves over the latter to the cutter-head a hopper in front of the latter through the lower part of which the dogs of the 25 feed-chain pass and a support 47, in the rear end of the hopper to equalize for the inclination of the feed-trough within the hopper.

14. In a machine for finishing staves, the 30 combination of a feed-trough, a cutter-head revolving at right angles to it, a driving-shaft for the cutter-head, parallel to the feed-trough, a driving-pulley 21, thereon, a driving-pulley 22 at its end for the feed mechanism, a feed-chain, guiding and driving pulleys 35 13 and 14 for it, a driving-shaft 30 for the latter, a pulley 23 thereon driven from pulley 22 of the cutter-head shaft whereby the speed of the feed mechanism is dependent on and controlled by the latter and an intermediate gear-

train for driving shaft 30 of the feed mechanism. 40

15. In a machine for finishing staves, the combination of a cutter-head, a feed-trough, an adjustable stave-support, a movable feed-chain to advance staves over the feed-trough 45 to the cutter-head, outwardly-projecting dogs 10 secured by shanks to the feed-chain, shanks projecting also inwardly beyond the feed-chain and intermediate mechanism, capable of being actuated by said inwardly-projecting 50 shanks for the purpose of operating the adjustable stave-support.

16. In a machine for finishing staves, a construction for shifting the relation of a stave-support to a cutter-head, being substantially 55 a movement operated by the feed mechanism and consisting of the feed-chain having projections, in combination with a depressible link 38, held normally within the path of said projections and pivoted arms 39, 40 which 60 support said link.

17. In a machine for hollowing out staves, a construction for the purpose of determining the length of the part to be hollowed out by 65 shifting the relation of a stave-support to a cutter-head, being substantially a movement operated by the feed mechanism and consisting of the feed-chain having projections, in combination with a movable pattern-bar, being one of a series of different lengths and 70 pivoted arms 39, 40, upon which said pattern-bar is removably supported.

In testimony whereof I hereunto set my hand in presence of two witnesses.

WILLIAM A. GREAVES.

Witnesses:

C. SPENGLER,

JOHN C. ROGERS.