W. W. TREVOR.

MACHINE FOR SHAPING OAR BLADES.

APPLICATION FILED OCT. 9, 1906.

899,356.

Patented Sept. 22, 1908.

4 SHEETS—SHEET 1.

Fig. 1.

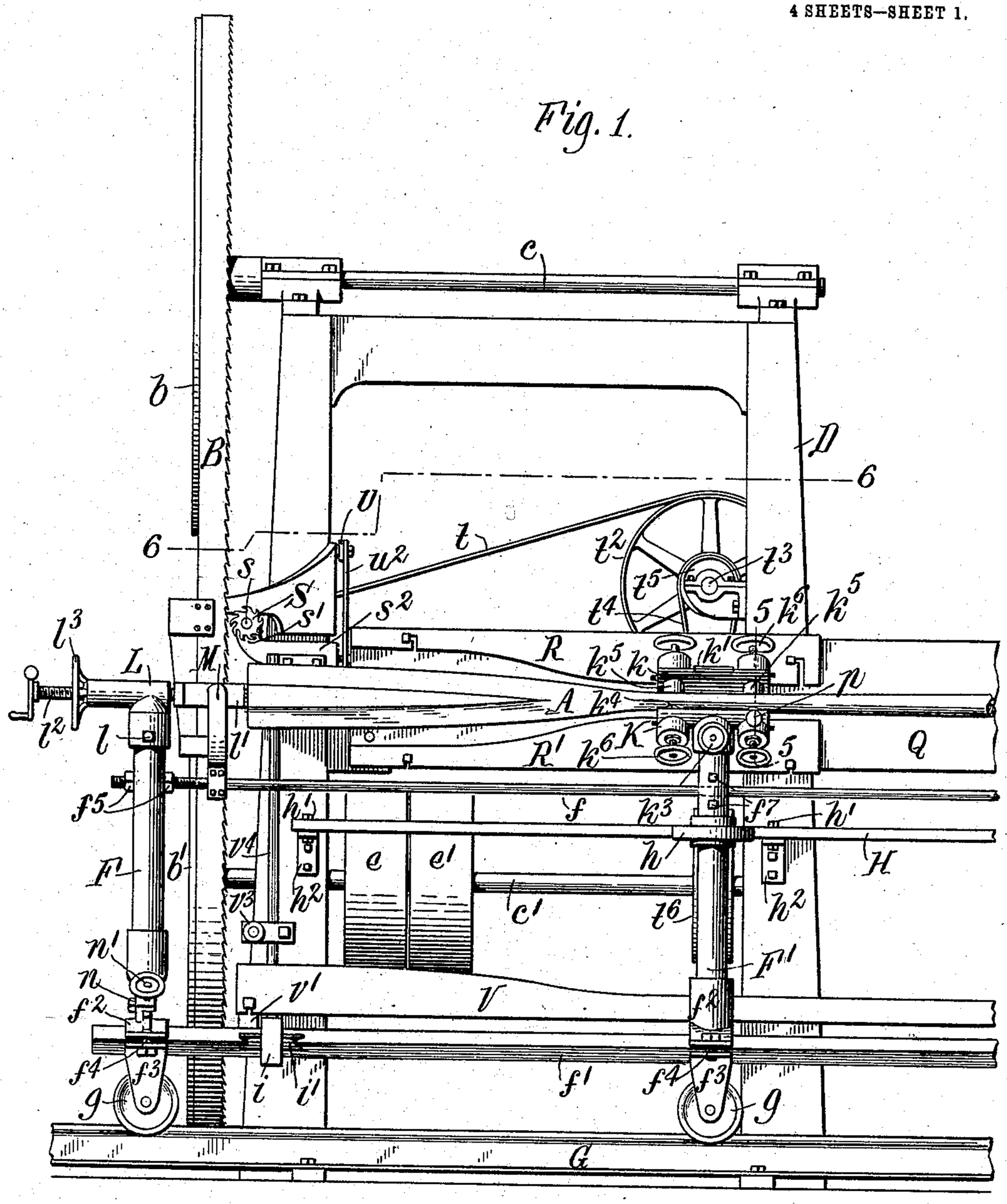
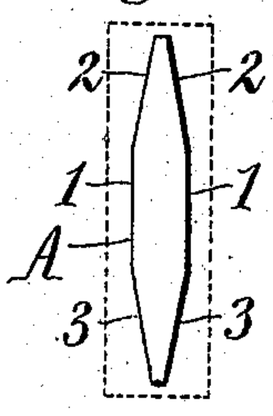


Fig. 2.



Witnesses:

A. L. McKee.

A. F. Dimond.

Inventor.

William W. Trevor

by Wilhelm, Parker & Hard

Attorneys.

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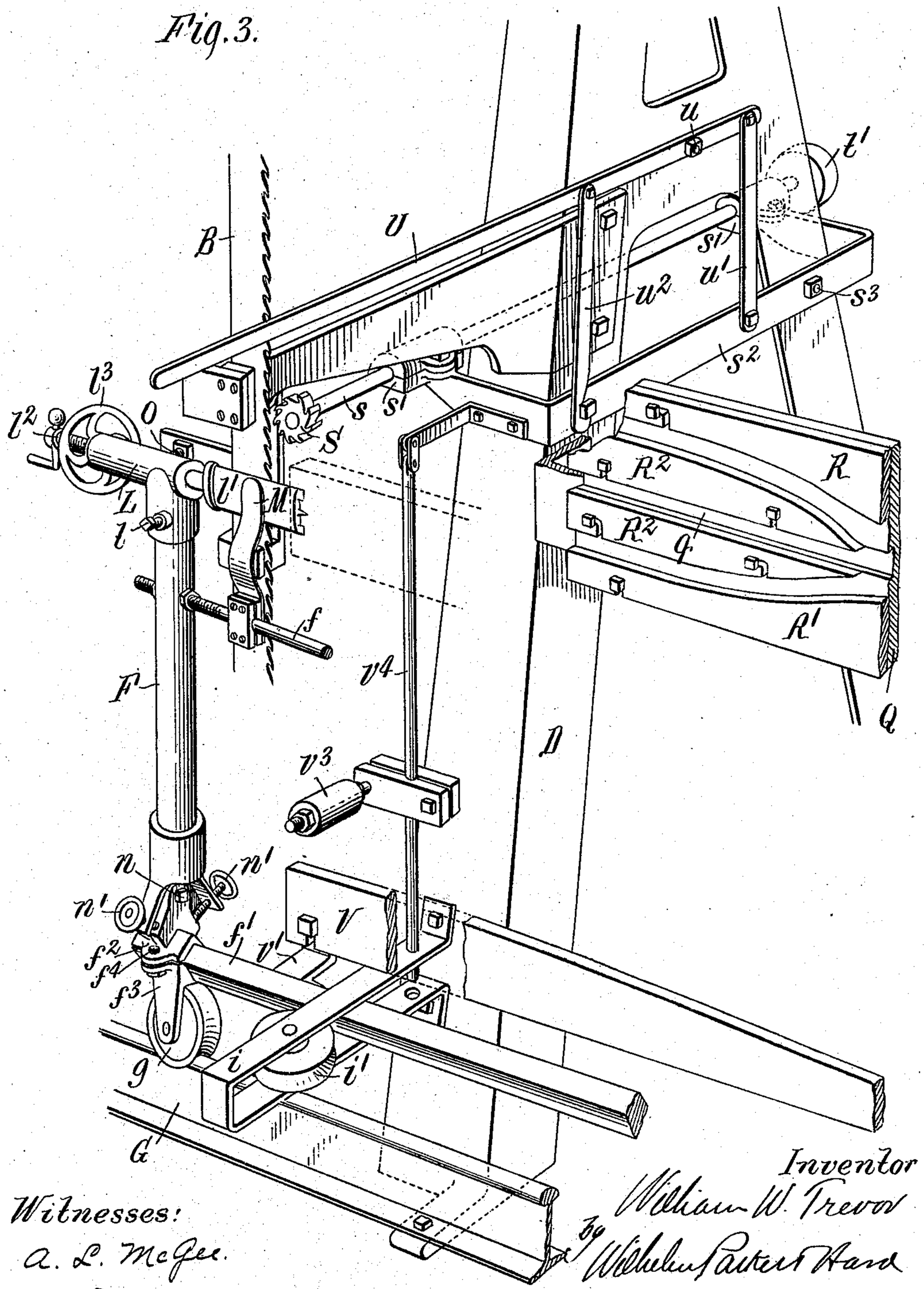
4 SHEETS—SHEET 2.

Fig. 3.



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4 SHEETS—SHEET 3.

Fig. 4.

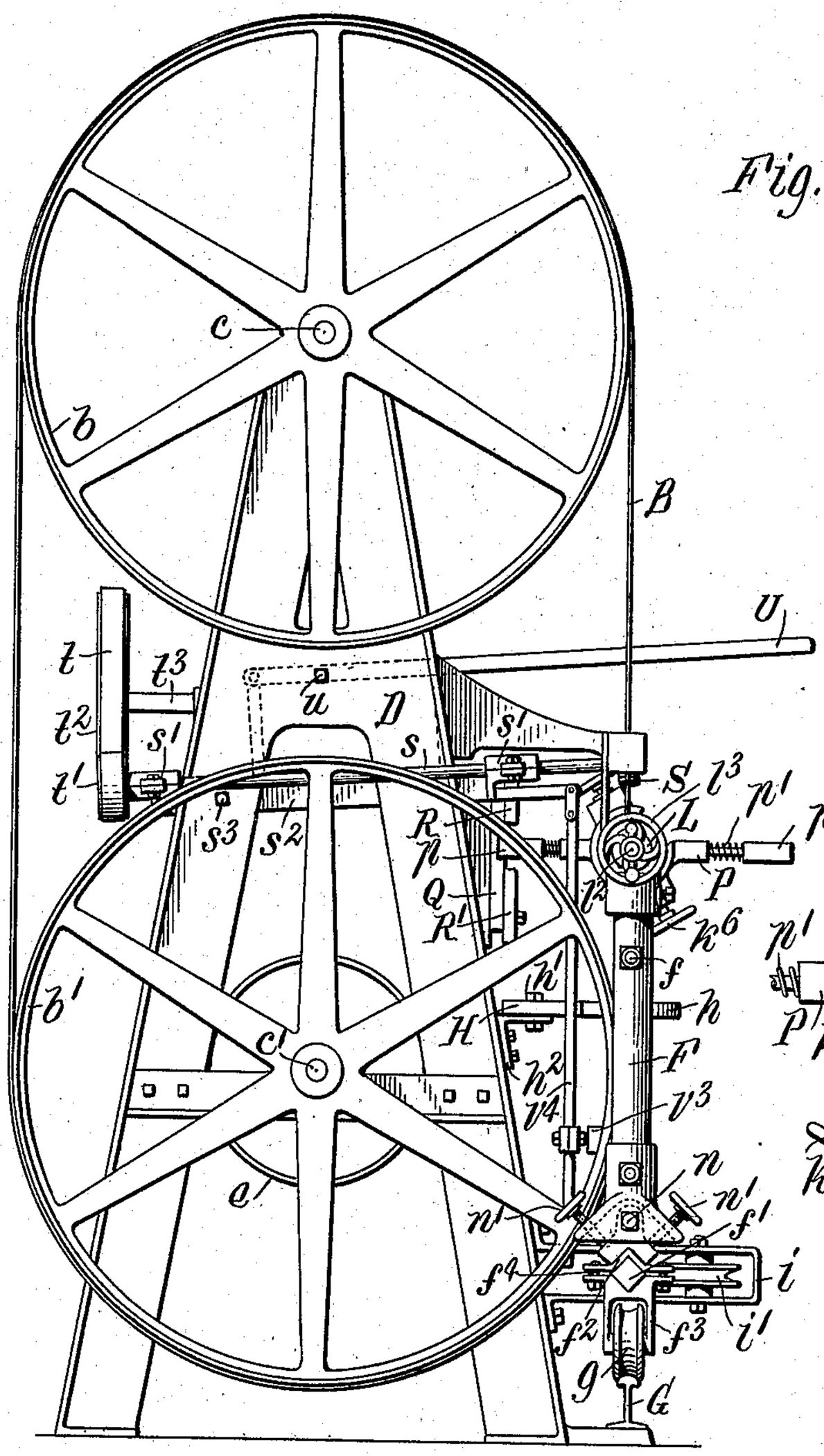
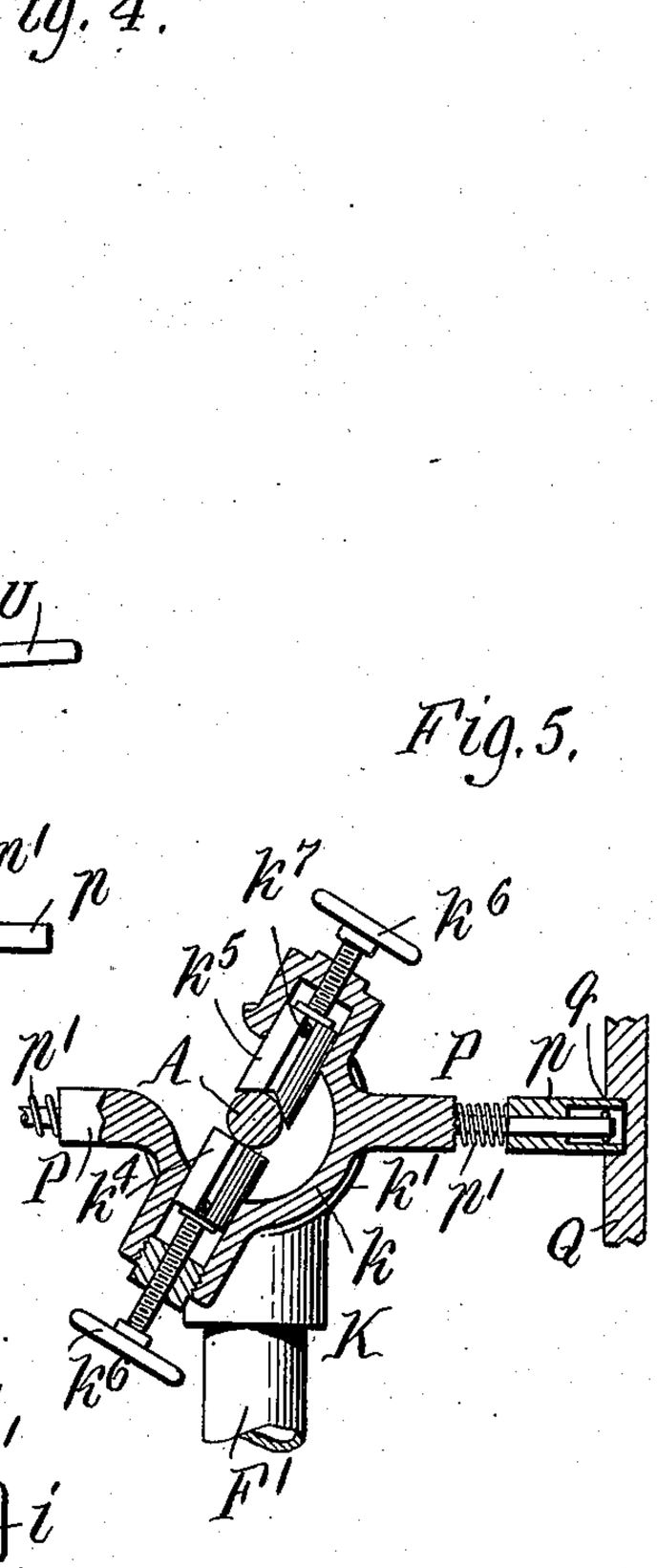


Fig. 5.



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4 SHEETS—SHEET 4.

Fig. 6.

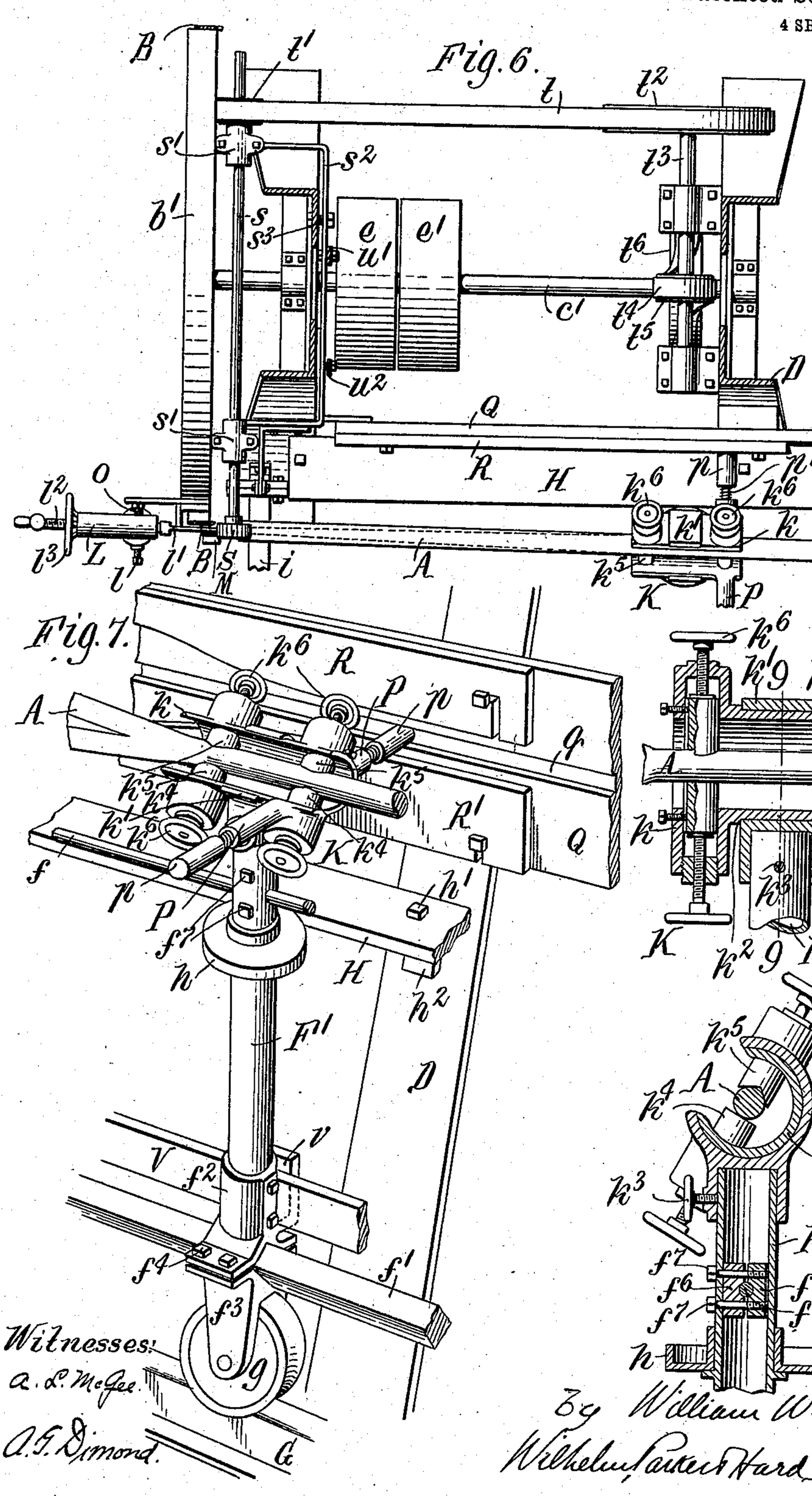

Fig. 7.

Fig. 8.

Fig. 9.

Witnesses:
A. L. McGee.
A. F. Dimond.

Inventor:
William W. Trevor,
By Wilhelm, Parker & Hard, Attorneys.

UNITED STATES PATENT OFFICE.

WILLIAM W. TREVOR, OF LOCKPORT, NEW YORK, ASSIGNOR TO TREVOR MANUFACTURING COMPANY, OF LOCKPORT, NEW YORK.

MACHINE FOR SHAPING OAR-BLADES.

No. 899,356. Specification of Letters Patent. Patented Sept. 22, 1908.

Application filed October 9, 1906. Serial No. 338,172.

To all whom it may concern:

Be it known that I, WILLIAM W. TREVOR, a citizen of the United States, residing at Lockport, in the county of Niagara and State of New York, have invented a new and useful Improvement in Machines for Shaping Oar-Blades, of which the following is a specification.

This invention relates to wood working machines more particularly intended for shaping or forming the blades of boat oars. The machine is, however, adapted by proper adjustments thereof and the employment of suitable pattern guides, for the production of other articles of analogous shape. The blade of an oar ordinarily tapers or decreases in width from its outer end to its juncture with the loom or stem while it decreases in thickness from the loom to the wide outer or tip end. The machine forming the subject of this application is for giving this general shape to the blades, by successive cuts forming three flat faces or surfaces on each side of the blade. The central faces at opposite sides are parallel in a direction crosswise of the blade, while the other faces converge from the central faces toward the edges of the blade. After the blade is thus shaped it is finished by hand or by other suitable means.

In the accompanying drawings, consisting of four sheets: Figure 1 is a front elevation of a portion of an oar blade sawing machine embodying the invention. Fig. 2 is a diagram showing the cross sectional shape of the oar blank by dotted lines and of the blade by full lines. Fig. 3 is a broken perspective view, on an enlarged scale, of a portion of the machine. Fig. 4 is an end elevation of the machine. Fig. 5 is a cross section of the blank chuck or head stock, on an enlarged scale, in line 5—5, Fig. 1. Fig. 6 is a fragmentary plan view of the machine, partly in horizontal section, in line 6—6, Fig. 1. Fig. 7 is an enlarged perspective view of the end of the oar carriage and the guide means therefor not shown in Fig. 3. Fig. 8 is a longitudinal sectional elevation, on an enlarged scale, of the head stock or chuck. Fig. 9 is a transverse section of the head stock or chuck, in line 9—9, Fig. 8.

Like letters of reference refer to like parts in the several figures.

A, Figs. 1, 2 and 6 indicates the oar or oar blank to be cut in the machine hereinafter described. From Fig. 1 it will be seen that the blade of the oar tapers in width from its outer or tip end to its juncture with the loom or shaft portion, and the blade also tapers or decreases in thickness from the loom portion to the outer or tip end, as indicated by the broken lines in Fig. 6 which show the line of cut of the saw, and, as shown in Fig. 2, the blade has two opposite central flat faces 1 and four other flat side faces 2 2 and 3 3. The two faces 2 2 at opposite sides of the blade converge from the central faces 1 toward one edge of the blade, and the other two faces 3 3 converge from the central faces 1 toward the other edge of the blade. B represents a saw for cutting these side faces. A band saw is preferably employed supported by and running around upper and lower saw wheels *b b'* which are secured to horizontal shafts *c c'* journaled in suitable bearings on a stationary frame D, which may be of any suitable form and construction. The saw may be driven by any suitable means. In the construction illustrated, tight and loose pulleys *e e'* for a drive belt are provided for this purpose on the shaft *c'* for the lower saw wheel. The oar blank is supported on a suitable carriage by which it is reciprocated past the saw.

The reciprocating oar carriage preferably consists of two hollow upright end posts or columns F F' adjustably connected by upper and lower horizontal rods or bars *f f'*. The lower connecting bar is of angular cross-section and extends through angular openings in the end posts formed by upper and lower clamping members f^2 f^3 on each post which are connected by screws or bolts f^4, see Figs. 3 and 7. By tightening up these screws or bolts the posts are securely clamped on the lower connecting bar. This manner of clamping the posts on the connecting bar enables the same to be readily adjusted toward and from each other and prevents the posts from twisting or turning on the bar. The upper connecting rod or bar *f*, in the construction shown, has a threaded end passing through a hole in the end post F and fixed thereto by nuts f^5 on opposite sides of the post, see Figs. 1 and 3. The other end of the rod *f*, see Figs. 7 and 9, passes loosely through a hole in the other end post F' between clamping blocks f^6 confined within the post. These clamping blocks are connected by screws f^7 which project out through holes in

the post, whereby they can be turned to grip or release the connecting rod and thus clamp the post thereto or disconnect it. The carriage is supported by suitable wheels *g* journaled in the lower ends of the end posts and traveling on a horizontal track or rail G which is fixed to the feet of the stationary frame D. The rail preferably has a rounded or convexed top and the wheels *g* are grooved so that the carriage is retained on the rail and readily guided and can be swung on the rail toward and from the plane of the saw. The carriage could be of other suitable construction.

H, Figs. 1, 4, 6 and 7, represents a horizontal guide rail which is secured in any suitable manner to the stationary main frame D and has a straight outer edge against which an anti-friction roller *h* journaled on the end post F′ of the carriage is adapted to travel. This guide rail and roller limit the movement of the carriage rearwardly toward the plane of the saw and cause the carriage, which in operation is pressed over toward the guide rail, to move in a straight line parallel with the cutting plane of the saw when reciprocated on its supporting rail or track G. The guide rail H is removably secured by bolts *h′* to brackets h^2 on the main frame, or is otherwise detachably secured, so that it can be readily removed and replaced by another wider or narrower rail whereby the position of the carriage with respect to the cutting plane of the saw can be regulated as required for sawing oars of different thickness. Suitable means are also provided for limiting the outward swing of the oar carriage. The means shown for this purpose consist of a yoke or loop *i*, Figs. 1 and 3, projecting out from the stationary frame and having at its outer portion a roller *i′* against which the lower horizontal bar of the carriage, which passes through said loop, is adapted to strike. The upper end of the carriage can be swung forwardly away from the cutting plane of the saw for placing the oar blanks in and removing them from the carriage, but the stop roller *i′* will prevent the carriage from falling forwardly too far.

K, Figs. 1, 5—9, represents a head stock or chuck on the oar carriage for holding the loom or stem of the oar, and L represents a coöperating tail stock carrying a center on which the blade end of the oar blank is supported. The head stock or chuck is adapted to turn or rotate on the carriage about a horizontal axis with the oar blank secured therein to reverse the blank, and also to swivel horizontally on the carriage to enable a proper alinement of the same with the center of the tail stock. The chuck is preferably constructed as follows:—*k* represents a segmental cylindrical shell or body open at one side and journaled to rotate about a horizontal axis in a segmental cylindrical head *k′* which is swiveled to turn horizontally on the upper end of the end post F′ of the oar carriage. The chuck body is provided with shoulders k^2 which bear against the opposite ends of the swivel head *k′*, or other means, to prevent endwise movement of the body in the head. The head is provided with a set screw k^3, or other means, for securing it stationarily upon the end post when it has been turned to the proper position to aline the chuck axially with the tail stock center. The chuck body is provided at each end with a pair of clamping blocks k^4 k^5 for the oar loom. These blocks are moved toward and from the center of the chuck to clamp and release the loom, by hand screws k^6 passing through threaded holes in the chuck body and swiveled to the clamp blocks. The blocks are preferably held from turning in guide pockets in the chuck body by screws k^7 extending through the walls of the pockets into longitudinal grooves in the sides of the clamp blocks. The inner ends of the clamp blocks k^4 are preferably flat, while the inner ends of the coöperating block k^5 have V-shaped grooves. To secure the oar in the chuck the grooved clamp blocks are moved away from the coöperating blocks, the oar is placed in the chuck body on the latter blocks and the grooved blocks are then forced inwardly to grip the loom. The flat-ended blocks are set in the proper position to properly center an oar blank, and after the blank is removed other blanks of the same diameter can be secured in the chuck without moving these blocks, and the oars will always be thus exactly centered in the chuck. It is only necessary to readjust the flat-ended clamping blocks when an oar of different diameter is to be made. The tail stock L is preferably swiveled on the upper end of the other end post F of the oar carriage and is provided with a set screw *l*, or other means, for securing it in angularly adjusted position. The center *l′* is movable endwise in the tail stock and swiveled to the usual screw l^2 by which it can be moved to engage and release the oar blank.

l^3 is the usual locking nut or wheel for the adjusting screw.

The tail center is preferably relatively wide and thin, as shown in Fig. 3, and has sharp points or teeth at its inner end to engage the blade end of the oar blank.

M, Fig. 3, represents a spring finger or device which is secured to the upper horizontal rod or bar of the carriage, or other suitable portion thereof, and bears at its free end against one of the broad faces of the tail center. This spring normally holds the center with its greater width vertically or parallel with the saw, but the spring will yield to permit the center to turn in the tail stock when the oar blank is turned to present opposite sides thereof to the saw. If the blank should

be removed from the machine or released when the center is turned from the position shown in Fig. 3, the spring M bearing against the center will always turn it with its wide sides parallel with the saw and will thus prevent the center from striking the saw in case the operator should move the carriage on its track.

As the oar carriage reciprocates in a plane parallel with the cutting plane of the saw, it is necessary, in order to cut the opposite tapering sides of the blade, to adjust the tail stock nearer to the plane of the saw than the head stock or chuck. For this purpose the end post F of the oar carriage is preferably jointed at *n* in any suitable manner, and the upper member of the post is provided at opposite sides thereof with set screws *n'* which bear against the opposite sides of the lower member of the post. By turning one screw out and the other in, the top of the upper member of the post with the tail stock can be adjusted nearer to or farther from the plane of the saw to the extent required for cutting oar blades of different thicknesses or of different tapers. A gage or other adjustable device O is preferably provided on the tail stock to strike a coöperating bracket O' or stationary part of the main frame to prevent the upper portion of the carriage bearing the tail stock from being sprung or pressed rearwardly far enough from the center to strike the saw or to cause the blade to be cut thinner than is intended. Other suitable means for thus adjusting the tail stock and gaging its position could be employed.

P, Figs. 5 and 7, represents arms projecting laterally from opposite sides of the chuck body for moving the oar carriage and guiding the oar blank in the reciprocations of the carriage. These arms preferably have rollers *p* at their outer ends which are pressed outwardly on the arms by suitable springs *p'*. In either position of the chuck one arm projects forwardly so that it can be grasped and will serve as a handle to move the carriage, while the other arm projects rearwardly so that its roller will coöperate with stationary guides on the main frame of the machine, see Figs. 3 and 7, consisting preferably of a straight horizontal groove *q* in the front face of a bar Q on the main frame, and oppositely arranged pattern strips R R' which are removably secured in any suitable manner to said frame bar Q. The rearwardly projecting roller is moved along in the guide groove *q* to cut the central side faces of the blade. The lower edge of the upper pattern strip R and the upper edge of the lower pattern strip R' are so shaped that by holding the rearwardly projecting guide roller against one or the other of these edges as the carriage is advanced toward the saw, the oar blank will be turned or twisted on the carriage in such a manner that the saw will cut the converging side faces 2 and 3 of the oar blade to the proper form. Different pattern strips R R' are provided, one set being employed for cutting blades of one shape or size and another set for cutting blades of another shape or size.

The operation of the machine as thus far described is as follows: The machine is intended more especially for sawing the blades after the loom or shaft has been turned into finished form. The end posts F F' of the carriage are adjusted the proper distance apart for the oars of the length to be cut, and the upper member of the end post F is adjusted toward the saw in the manner explained to set the tail stock at the desired distance from the saw, depending upon the thickness of the blade. The gage screw O on the tail stock is also adjusted to strike the coöperating stop bracket when the center is in the desired position. A blank is then secured in the chuck in the manner described, with the greater width of the blade end of the blank vertically. The head and tail stocks are adjusted angularly with their axes in alinement and the center of the tail stock is advanced by its operating screw to engage and hold the oar blank. The adjustments are such that the blank will be held in an oblique position or at an angle to the direction of travel of the carriage, as shown in Fig. 6. The saw is then started and the operator grasps the forwardly-projecting arm or handle P and presses the carriage over rearwardly until the roller *h* on the carriage bears on the guide rail H and the roller *p* on the rearwardly-projecting arm P engages in the straight guide groove *q*, and the carriage is advanced toward the saw by pushing on the handle. During the advance movement of the carriage the guide roller and groove will hold the blank from turning and the saw will cut off a wedge-shaped slab and form the central flat face 1 on the rear side of the blank. The carriage is then preferably swung forwardly away from the saw and retracted, and the chuck is turned slightly and the carriage swung rearwardly so that the rearwardly-projecting guide roller will bear against the lower edge of the upper pattern strip R. The carriage is then again advanced and the handle pressed inwardly and downwardly to maintain the guide roller against the edge of the upper pattern strip. The blank is thus given a twisting or turning movement as it is advanced past the saw, and the lower inclined face 3 at the rear side of the blade will be cut. The carriage is again swung forwardly and retracted and the rearwardly-projecting guide roller caused to bear against the upper edge of the lower pattern strip R' against which it is held by an upward and inward pressure on the operating handle while the carriage is again advanced past the saw, which cuts the upper inclined

face 3 at the rear side of the blank. The carriage is then again swung forwardly away from the saw and the oar chuck is turned through a half circle or so that the arm P which previously projected forwardly from the chuck will project rearwardly for its roller p to coöperate with the guides, while the other arm will project forwardly and constitute the operating handle. The carriage is then reciprocated as before, cutting first the central and then the two inclined faces on the other side of the blade. If desired, guide strips R^2, Fig. 3, can be provided which with the pattern strips form grooves for the guide rollers p and relieve the operative from the work of pressing the roller against the pattern strips in cutting the inclined faces of the blade.

After the side faces of the blade are sawed, as above explained, the edges are finished in the machine shown by a rotary cutter S. This cutter is arranged above the blank in the plane thereof and is secured to a shaft s journaled in suitable bearings s' on a yoke or frame s^2 which is pivoted at s^3 to the main frame to swing up and down, so that the edge cutter can rise and fall to follow the line necessary to give the desired shape to the edges of the blade. The edge cutter can be driven by any suitable mechanism. In the machine illustrated the cutter shaft is driven by a belt t and pulleys t' t^2 from a horizontal counter shaft t^3, and this shaft is in turn driven from the main drive shaft c' by a belt t^4 and pulleys t^5 t^6, see Figs. 1, 4 and 6. The edge cutter could, if desired, be operated to trim the edges of the blade at the same time that the saw is cutting the side faces, but the edges of the blade are preferably not trimmed until after the blade has been shaped by the saw, because the blank is then left with thin edges and much less power is required to drive the edge cutter S. The edge cutter is, therefore, normally held up, as shown in Figs. 1 and 3, so that it cannot engage the blank, by a lever U which is fulcrumed at u on the main frame and is connected to the pivoted frame for the edge cutter by a link u' and hook u^2 arranged at opposite sides of the lever pivot. The hook engages a bolt or projection of the pivoted frame. By depressing the front end of the lever and disengaging the hook from the frame, the frame can be lowered until the edge cutter is in operative position. The edge cutter is guided by a pattern plate V, Figs. 1 and 3, which is detachably secured in any suitable manner to the reciprocating carriage. The pattern plate shown rests at one end in a socket v, Fig. 7, on the end post F′ of the carriage and the other end is bolted to a bracket v', Fig. 3, projecting from the lower horizontal bar of the carriage. A guide roller v^3 adjustably secured in any suitable manner to a vertical rod v^4 connected at its upper end to the front end of the pivoted frame of the edge cutter is adapted to travel on the edge of the pattern plate. The lower end of the rod v^4 is preferably guided by passing through holes in the yoke i projecting from the main frame. The pattern plate has an edge of the shape to be given to the edge of the oar blade. By holding the oar blank on the carriage with one edge uppermost, as in cutting the central side faces, and moving the carriage past the cutter, the roller v^3 traveling on the pattern plate will cause the edge cutter to follow a similar path and properly trim the edge of the blade. The blank is then reversed and the other edge similarly trimmed.

The carriage in the machine described is intended to be reciprocated by hand, but it could be reciprocated mechanically if desired.

I claim as my invention:

1. The combination of a driven cutter arranged in a relatively fixed location, a carriage arranged to reciprocate in a straight line past the cutter, devices on the carriage which hold the blank obliquely to the direction of movement of the carriage and which are rotatable to turn the blank about its axis, one of said holding devices embracing the blank between the ends thereof, a pattern past which the carriage moves, and a guide device which is connected to the blank holding means and is held against said pattern to regulate the turning of the blank as the carriage is advanced, substantially as set forth.

2. The combination of a driven cutter arranged in a relatively fixed location, a carriage arranged to reciprocate in a plane parallel with the plane of the cutting edge of the cutter, devices on the carriage which hold the blank obliquely to the direction of movement of the carriage and which are rotatable to turn the blank axially and are adjustable to change the obliquity of the blank, one of said holding devices embracing the blank between the ends thereof, a relatively stationary pattern, and a guide device which is connected to the blank-holding means and is held against said pattern as the carriage advances to regulate the turning of the blank, substantially as set forth.

3. The combination of a saw arranged in a relatively fixed location, a carriage arranged to reciprocate in a plane parallel with the cutting plane of the saw, holding devices for the blank which are angularly adjustable on the carriage to regulate the obliquity of the blank to the direction of movement of the carriage and are freely rotatable to turn the blank about its axis, a pattern past which the carriage moves, an operating handle for the carriage secured to one of said holding devices, and a guide device which is connected to said holding device and is caused

to bear against said pattern as the carriage advances by hand pressure on said handle, substantially as set forth.

4. The combination of a driven cutter, a carriage arranged to reciprocate past the cutter, means for holding the blank on the carriage and for turning the blank about its axis, two oppositely disposed patterns past which the carriage moves, and a guide device which is connected to the blank-holding means and is held against one of said patterns to regulate the turning of the blank in one direction and is held against the other pattern to regulate the turning of the blank in the opposite direction, substantially as set forth.

5. The combination of a driven cutter, a carriage arranged to reciprocate past the cutter, means for holding the blank on the carriage and for turning the blank about its axis to present different portions thereof to the cutter, a pattern past which the carriage moves, and two devices projecting from said blank-holding means, each of which devices serves as a handle for holding the other against said pattern to guide the blank, one device acting as the guide in one position of the blank and the other acting as the guide in another position of the blank, substantially as set forth.

6. The combination of a saw arranged in a relatively fixed location, a carriage arranged to reciprocate past the saw, blank holding devices on said carriage which are rotatable for turning the blank about its axis, one of said devices being adjustable laterally toward and from the plane of the saw and both of said devices being angularly adjustable to aline them in different lateral adjustments of the first mentioned device whereby the blank can be held in different positions obliquely to the direction of movement of the carriage, a pattern plate past which the carriage moves, and a guide which is connected to one of said holding devices and is held against said pattern plate, substantially as set forth.

7. The combination of a driven cutter, a carriage arranged to reciprocate past said cutter and also to swing toward and from the plane of the cutter, holding devices for the blank which are angularly adjustable, and one of which holding devices is also adjustable toward and from the plane of the cutter, said holding devices being also constructed to turn the blank about its axis, and guide means for said blank, substantially as set forth.

8. The combination of a driven cutter, a carriage arranged to reciprocate past the cutter and also to swing toward and from the plane of the cutter, holding devices for the blank which are angularly adjustable on the carriage and one of which is adjustable toward and from the plane of the cutter, said holding devices being also rotatable to turn the blank about its axis, a guide device secured to one of said holding devices, and a pattern plate against which said guide device bears as the carriage is advanced, substantially as set forth.

9. The combination of a driven cutter, a carriage arranged to reciprocate past said cutter and having grooved supporting wheels, a track having a rounded face on which said carriage wheels travel whereby the carriage is adapted to swing toward and from the cutter, means for guiding said carriage, and means for guiding the blank in the advance movement of the carriage, substantially as set forth.

10. The combination of a driven cutter, a carriage consisting of upright end posts, and horizontal bars adjustably connecting said end posts, supporting rollers for said carriage, a track on which said rollers travel, means for adjusting the upper portion of one of said end posts toward and from the plane of said cutter, holding devices for the blank which are angularly adjustable on said carriage, and guide means for said carriage, substantially as set forth.

11. The combination of a driven cutter arranged in a relatively fixed location, a carriage for holding the blank arranged to reciprocate lengthwise of the blank past said cutter, a holding device for the blade end of the blank, and a hollow chuck for holding the loom, clamping devices carried by said chuck and which are movable to grasp and release the loom, and means for turning said chuck, a pattern past which the carriage travels, and a guide secured to said chuck and bearing against said pattern to regulate the turning of said blank, substantially as set forth.

12. The combination of a driven cutter arranged in a relatively fixed location, a carriage for holding the blank arranged to reciprocate lengthwise of the blank past said cutter, a holding device for the blade end of the blank, and a chuck for holding the loom comprising a rotatable open-sided shell, clamping devices for the loom carried by said shell, and an open-sided support in which said shell is mounted to rotate, said holding device and said chuck support being angularly adjustable to hold the blank obliquely to the line of movement of the carriage, substantially as set forth.

13. The combination of a saw arranged in relatively fixed location, a carriage arranged to reciprocate past the saw, means for rotatably holding the blank on the carriage, guide means for turning the blank as it passes the saw, a driven edge cutter, a pattern on the carriage, and means coöperating with said pattern to guide said edge cutter, substantially as set forth.

14. The combination of a saw arranged in relatively fixed location, a carriage arranged to reciprocate past the saw, means for rota-

tably holding the blank on the carriage, guide means for turning the blank as it passes the saw, a movable driven edge cutter, a pattern on the carriage, means coöperating with said pattern to guide said edge cutter, and means for normally holding said edge cutter out of action, substantially as set forth.

Witness my hand, this 3d day of October, 1906.

WILLIAM W. TREVOR.

Witnesses:
FRANCES N. TREVOR,
H. F. CUSHMAN.