2 Sheets--Sheet 1.

R. W. GEORGE.

Machines for Jointing and Planing Staves.

No. 139,242. Patented May 27, 1873.

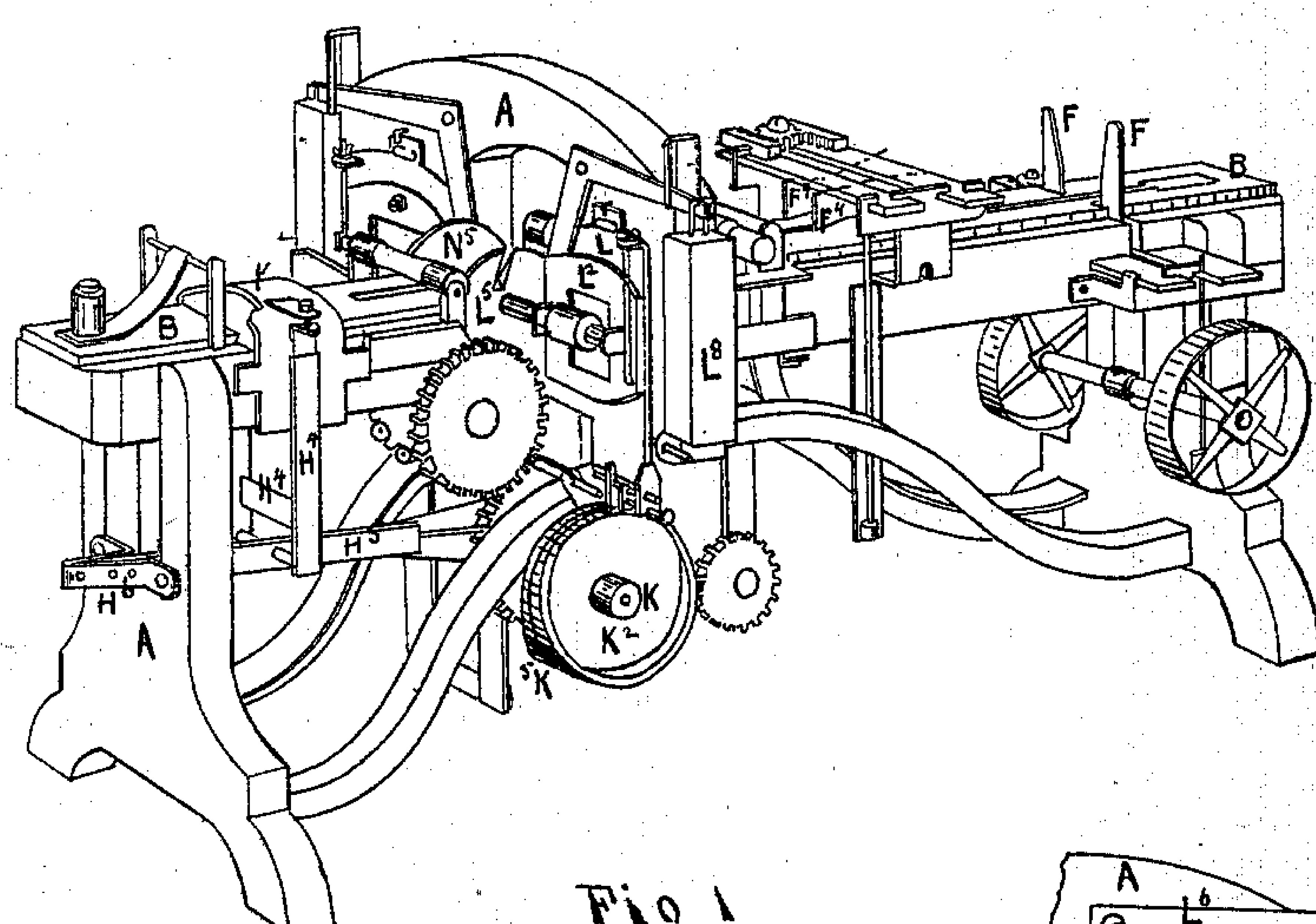

Fig 1

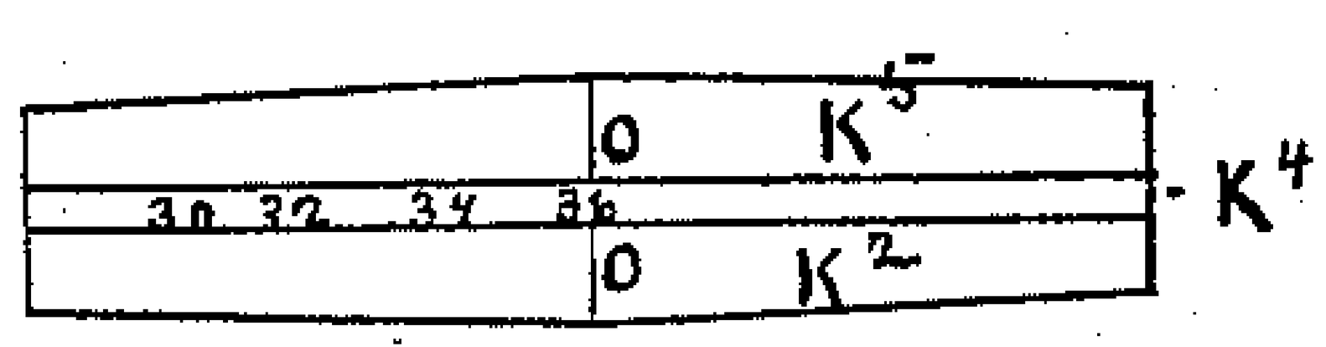

Fig. 4.

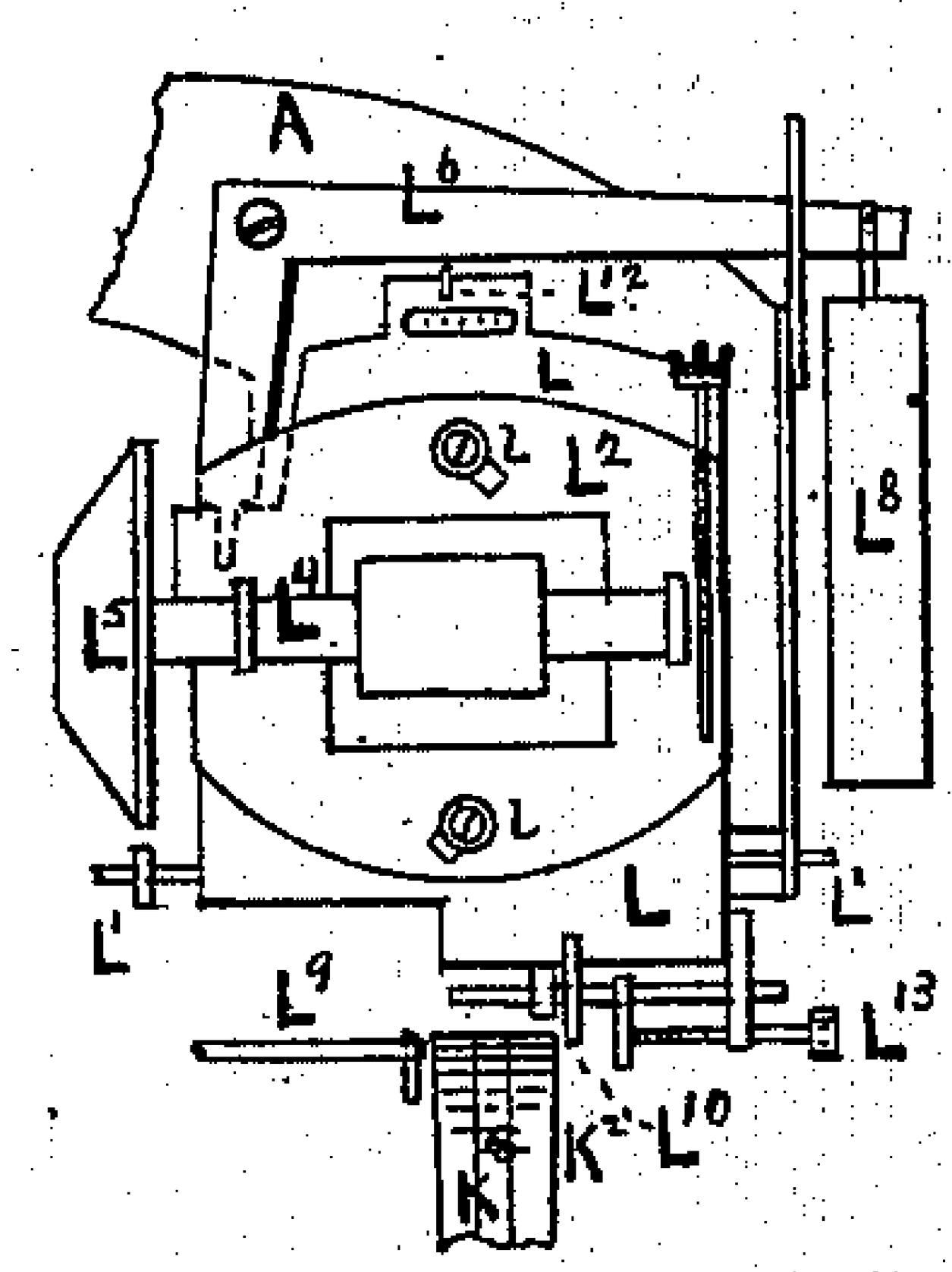

Fig. 7.

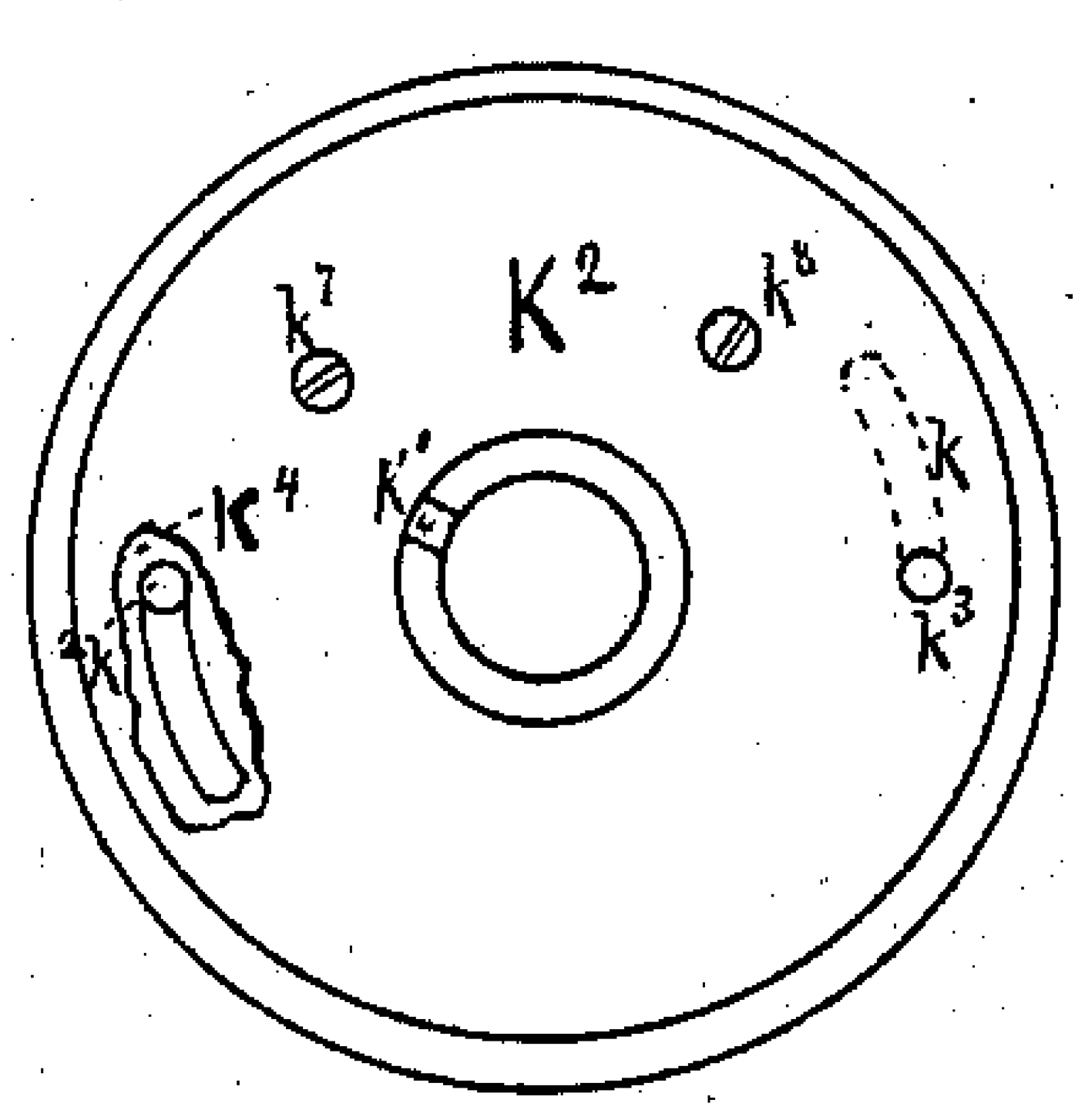

Fig 5

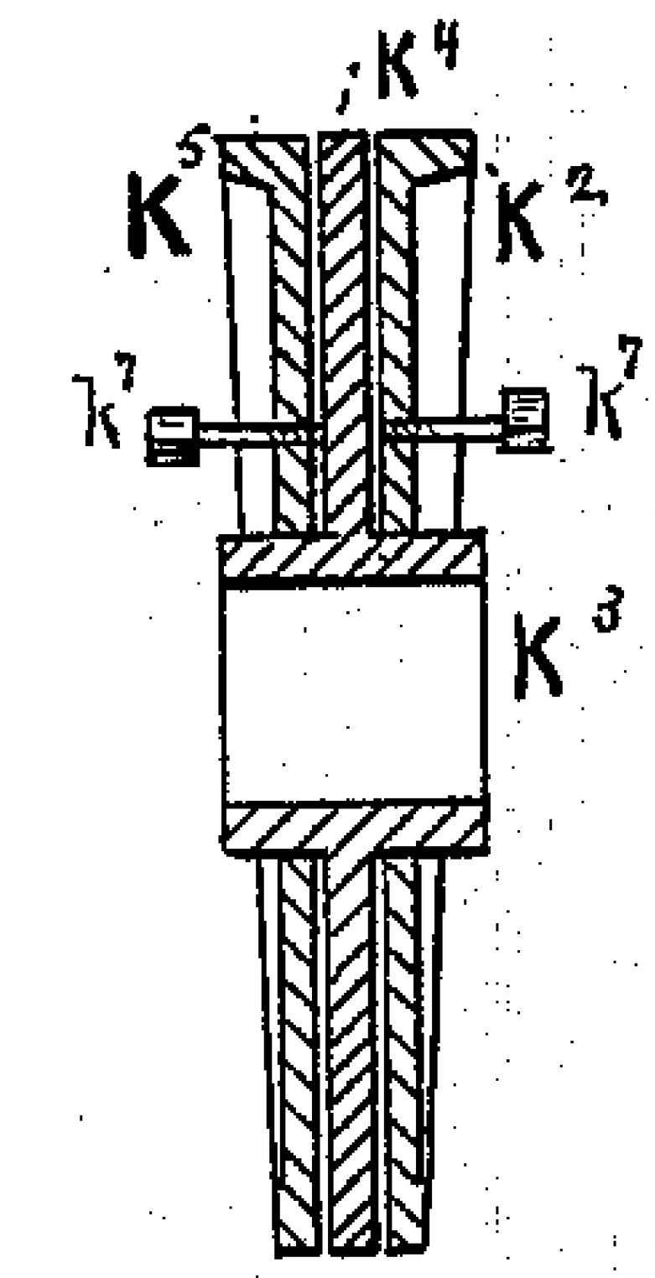

Fig 6

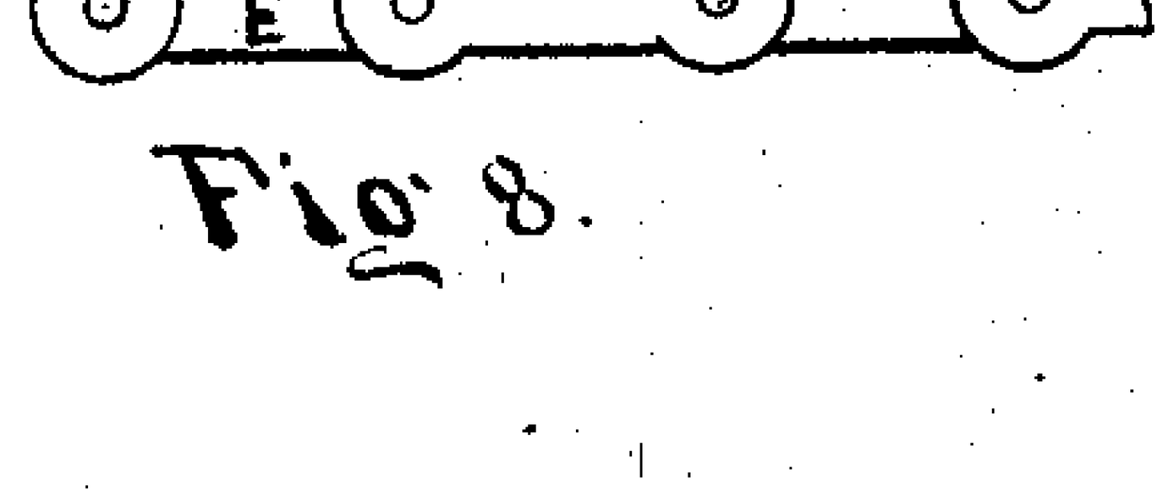

Fig 8.

WITNESSES

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Charles P. George

INVENTOR

Robert W. George

AM. PHOTO-LITHOGRAPHIC CO. N.Y. (OSBORNE'S PROCESS).

2 Sheets--Sheet 2

R. W. GEORGE.

Machines for Jointing and Planing Staves.

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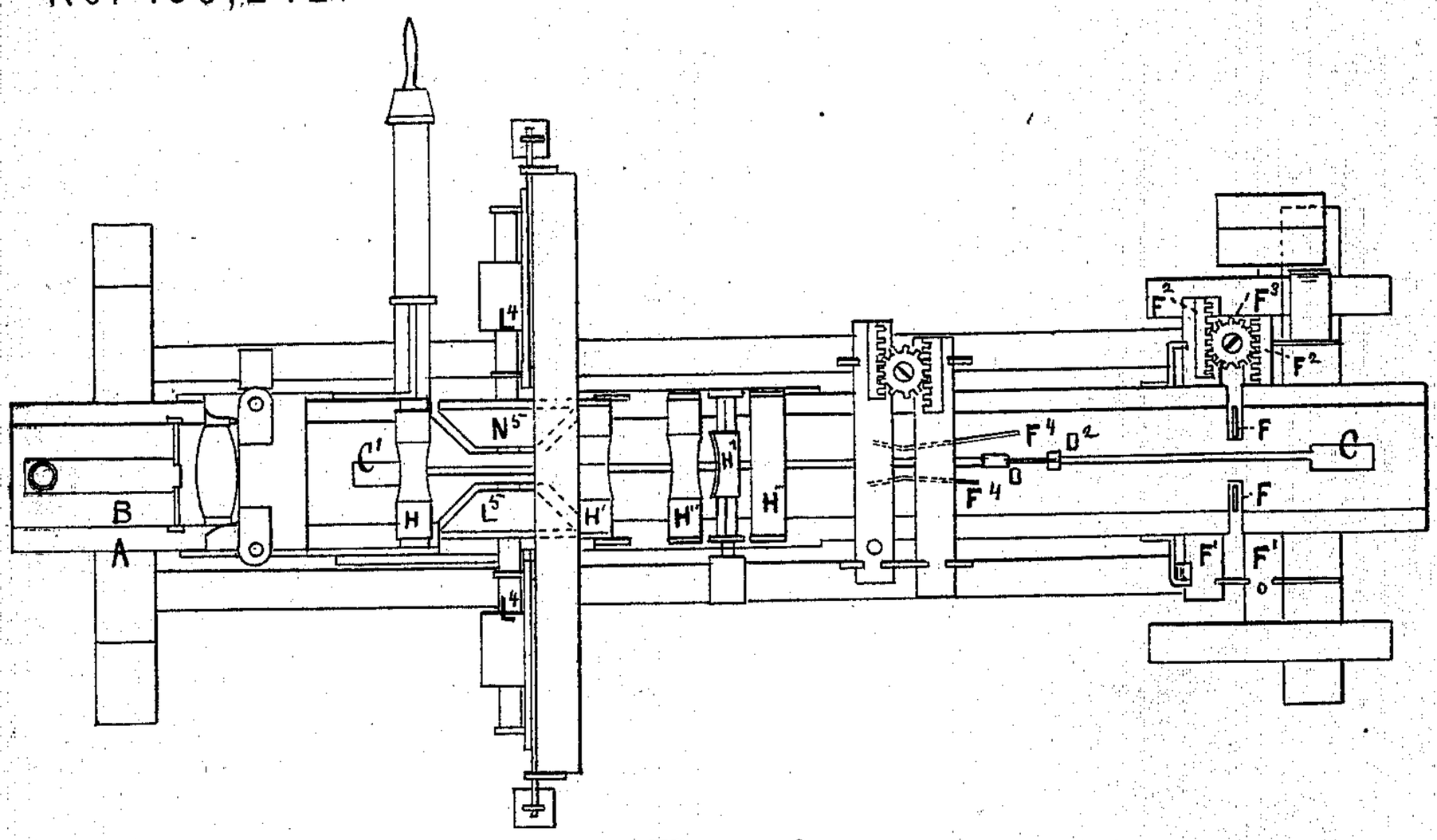

Fig. 2.

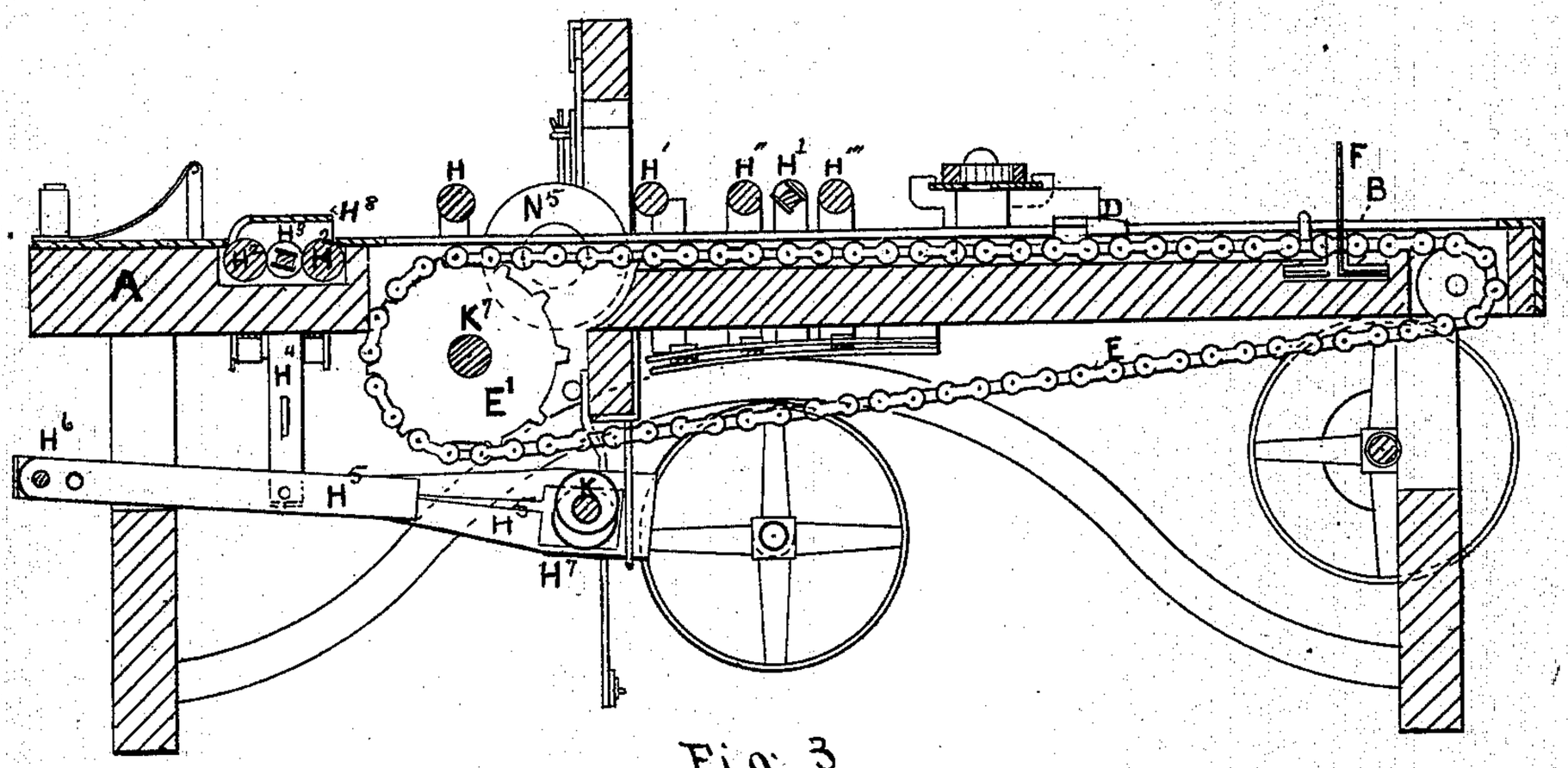

Fig. 3

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ROBERT W. GEORGE, OF BOSTON, MASSACHUSETTS, ASSIGNOR TO CHARLES P. GEORGE, OF SAME PLACE.

IMPROVEMENT IN MACHINES FOR JOINTING AND PLANING STAVES.

Specification forming part of Letters Patent No. **139,242**, dated May 27, 1873; application filed May 8, 1873.

To all whom it may concern:

Be it known that I, ROBERT W. GEORGE, of Boston, in the county of Suffolk and State of Massachusetts, have invented a certain new and useful Improvement in Machines for Planing and Jointing Staves, of which the following is a specification:

The Nature and Object of the Invention.

The object of my invention is to embody in a single machine devices for planing and jointing staves.

The combination and construction of the devices can be best understood by reference to the specification and drawing.

Description of the Drawing.

Figure 1 is a perspective view of my machine. Fig. 2 is a plan of the same. Fig. 3 is a longitudinal vertical section through the center of the machine. Figs. 4 and 5 show, in plan and elevation, the cam-wheels for regulating the position of the cutter-heads for jointing the staves. Fig. 6 is a section of the same. Fig. 7 is an elevation, showing the plate to which the jointing cutter-heads are attached, and also the devices for adjusting the same. Fig. 8 is an elevation, showing one of the holding-dogs attached to the feed-chain.

General Description.

A A is the frame to which the various parts of my machine are attached. B B, Figs. 1, 2, and 3, is the plate or table of the machine on which the staves slide. C C′, Fig. 2, is a slot extending centrally through the plate B. D, Figs. 2 and 3, represents one of the holding-dogs, of which there are a number attached to the endless chain E. These dogs are formed as shown in Fig. 8, having a sharp prong or prongs, D^1, for holding the end of the stave. These dogs come up through the opening C, and, traversing the bed-plate along the longitudinal slot, pass down through at C′. At the rear end of the dogs I place a cross-head, D^2, Figs. 2 and 8, which, extending across the slot, rests upon the bed-plate, its object being to feed the stave under the planers and between the jointers. The chain E E is driven by the sprocket-wheel E′, Fig. 3. My object in attaching a cross-head to the dogs, as shown in Fig. 8, is to relieve the chain from a portion of the strain. It will be seen that the chain will be subject to an immense strain when forcing the stave forward while the cutters are acting upon it. On the forward part of the dog I attach a cross-head, so as to run on each side of the slot C C′ and against the bottom of the bed B, and at the rear end of the dogs I attach another cross-head bearing on each side of the slot and against the top of the bed. It will be easily seen how these two bearings will prevent any rocking motion of the dogs, and consequently any lifting of the chain. F F, Figs. 1 and 2, are guides attached to the slides F^1 F^1, forming, with other devices, a self-centering guide, each of these guides having a rack-bar, F^2 F^2, which engages with the gear-wheel F^3, so that when one guide, F, moves in one direction the other guide F must move the same distance in the opposite direction. A spring or springs is attached to the slides F^1 F^1 to hold the guides always toward the center. F^4 F^4 is another set of guides, similarly constructed, which operate together in connection with the same device as that used for the guides F F. The object of this invention is to center the stave—that is, cause the staves to enter between the jointer-heads equally—and thus take off an equal amount of stock from each side, and therefore avoid waste. The jointer-heads being set equal distance each side the center of the machine, and as the guides F F and F^4 F^4, Figs. 1 and 2, force the stave into the center, this result is easily secured. H H′ H″ H‴ are holding-down rolls, and are arranged with springs or weights to give the desired pressure. H^1, Figs. 1, 2, and 3, is a revolving planer cutter-head, having concave knives, so that the back of the stave, which is up, may be planed to the required convexity and thickness. H^2 H^2 are rollers set below the bed-plate, and serve to press the stave upwardly against the guard K, Figs. 1, 2, and 3. H^3, Fig. 3, is a revolving planer cutter-head, with convex knives, which serve to plane the inner side of the stave into the required form. The revolving planer cutter-head H^3 is hung in a frame, H^4, Fig. 3, which is free to slide vertically. This frame is pivoted

to a lever, H^5, which has its fulcrum at H^6, Figs. 1 and 3.

The opposite end of the lever H^5 embraces the eccentric H^7 on the shaft K, Fig. 3, and as the shaft revolves it oscillates, moving with it the frame H^4 and cutter-head H^3. The eccentric H^7 is adjustable on the shaft K, so that the time of the upward and downward movement of the cutter-head may be regulated to agree with the passage of the stave, it being lowest, while the ends of the stave are subject to its action, and highest when the center of the stave passes over it, so that the central part of the stave will be thinnest. This mode of planing is advantageous in working thick staves, as it facilitates bending them with the truss-hoop. The jointers L^5 N^5 on the arbors L^4 L^4, Fig. 1, are hung in frames L L^2, one of which is shown in detail in Fig. 7. The plate L L, Fig. 7, is attached to the frame A of the machine by the rod or slides L^1 L^1, which slide through brackets or projections from the frame, so that the whole plate L L, with all its parts, including the jointer cutter-heads L^5, is free to slide laterally in such manner as the motion of the cam-wheels K^2 K^5 require it to. L^{13}, Fig. 7, is a set-screw, for the purpose of varying the width of staves, as may be required, and is operated as follows: The screw L^{13} is connected with sliding frame L, whose lateral motion is governed by the cam-wheels L^2 L^5 acting against cam-guide K^2, this guide pressing against the set-screw L^{13}.

It will be seen that by turning the set-screw L^{13} against the cam-guide K^2 the sliding frame L and all its attachments will be forced away from the center of the machine, thus giving a wider stave, and by slacking said screw the frame will be forced inwardly by the pressure of the weights L^8, thus giving a narrower stave.

L^{12} is a pointer attached to the sliding frame L, and serves to indicate, by the graduations on the frame L, the exact lateral position of the jointer L^5, and, consequently, the width of stave being cut. L^2 is a second frame attached to sliding frame L, and consists of the journals in which the jointing cutter-head shafts run. This frame is secured to the sliding frame L by means of a pivot-pin placed opposite the center of the cutter-head shafts and at the end nearest the bed of the machine, and also by means of two set-bolts, *l l*, Fig. 7, and working in slots, as shown. This pivot-pin is of great importance in changing the bevel of the stave, as I will proceed to show. Its object, as I have stated, is in connection with bolts *l l*, Fig. 7, to enable the operator to obtain any bevel he may desire. The pin holds the head firm, and it is very little trouble to change. The jointer N^5 upon the opposite side of the machine is hung and operated in the same manner that L^5 is hung and operated, its outward motion being governed by the rod and boss L^9, which presses against the cam-guide K^5. The cam-guides K^2 K^5 are constructed as follows: K^4, Fig. 6, is a flange having a large hub, K^3, and fitted to shaft K, Fig. 1, in which a stationary spline is fitted, corresponding to a key-way, K^1, Fig. 5, in the flange-wheel K^4, Fig. 6; the object of the fixed spline is to always give the flange the same position on the shaft. On each side of the flange, and on the hub of the same, is fitted cam-wheels K^2 K^5, Fig. 6. The object of these disks is to regulate the cutting action of the jointers L^5 N^5, so that the stave may be jointed into the required shape or bilge. These disks or cams are held to each other and to the flange by means of bolts K^2 K^3, Fig. 5, passing through the slots K K^4. The bolts are body-bound in the disks or cams and work loose in the slots in the flange. The object in constructing this device is to vary the lengths and bilges of the staves. The manner of varying the lengths of the stave is as follows: Each stave must be the same width at both ends, and in order to have them so on this style of machine it is imperative that the cams should throw the jointer-heads widest apart at the exact time that the center of the stave is passing between them.

To secure this result, and also to give a perfect barrel-stave, the dogs D on the chain E are so placed as always to occupy a certain relative position in connection with the sprocket-wheel E′, shaft K, and spline K^1 on the shaft K, and the graduations on the disk K^4. The point at which the disks attain their greatest throw is marked by an **O**, Fig. 4.

Now, if the machine, jointing a thirty-six-inch stave, the **O** is set against 36 on the central disk K^4; if to joint a thirty-four-inch stave it will be necessary to change the cam-wheels, or one end of the staves will be wider than the other. Now, to make good work, slacken the bolts K^2 K^3, Fig. 5, and turn the cams around so as to bring 34 opposite the **O**-point on the central flange, then tighten the bolts again and proceed. The operation is the same for any length required.

In regulating the machine for different bilges the adjustments will be found in Figs. 6 and 7, and are described as follows: K^7 K^8, Figs. 5 and 6, are set-screws, placed near and at equal distances from the point of greatest throw of the cams. Of course, the more throw the cams have the more travel the jointer-heads will have, and, consequently, the greater the bilge of the stave.

Now, to increase the bilge of a stave the operator merely slackens bolts K^2 K^3, Fig. 5, and then screws the set-screws K^7 K^8 against the center stationary flange, and the throw-side of the cam is forced away from the flange, and from each other, and the throw greatly increased, thus giving more travel to the jointer-heads, and, of course, more bilge to the stave. To obtain a smaller bilge slacken the set-screws K^7 K^8 and reduce the throw of the cams.

The adjustment of the planer H^3 is effected by changing the position of the cam H^7, Fig. 3, on the shaft K, the principal adjustment

being the same as that already described for the jointer.

Having thus described my improved machine I will now give a brief description of its mode of operation.

Having adjusted the various parts, as heretofore explained, to suit the style of stave required, the operator takes the stave and places it between the guides F F and F^4 F^4, Fig. 1, which, by yielding equally each side, bring it centrally in the machine. The dogs D press against the stave and force it forward under the pressure rolls or springs H H, Fig. 2, which hold it down against the bed of the machine. It then passes under and is acted on by revolving cutter-head H^1, which gives the top side a convex shape. It continues on and passes between revolving jointer cutter-heads L^5 N^5, which, being forced outwardly by cams K^2 K^5, Fig. 1, and inwardly by weight L^8, Fig. 1, give both sides the required bilge and bevel. It is then passed under bed H^8, Fig. 3, and over revolving cutter-head H^3, which gives the bottom side the required form.

What I claim as my invention is the following—

1. In a stave-jointing machine, the dog D made with the cross-head D″ and combined with the feed-chain E and table B, substantially as described, and for the purpose set forth.

2. In a stave-jointing machine, the compound adjustable cam K^2 K^4 K^5, operating substantially as described, and for the purpose set forth.

3. The combination of the planer cutter-head H^3 with the frame H^4 H^5 and the eccentric H^7, operating substantially as described, and for the purpose set forth.

4. The self-centering guides F F and F^4 F^4, Fig. 1, operating substantially as described, and for the purpose set forth.

5. The vibrating pivoted frame L^2, carrying the cutter-head and shaft L^4 L^5, in combination with the sliding frames L and cams K^2 K^5, substantially as and for the purpose specified.

6. The adjusting-screw L^{13} in combination with the sliding frame L and cams K^2 K^5, substantially as and for the purpose set forth.

7. The combination of the revolving cutter-head H^1, feed-chain E, jointing-cutters L^5 N^5, cams K^2 K^5, and vertically-adjustable rotating cutter-head H^3, all being constructed and arranged as and for the purpose herein shown and described.

ROBERT W. GEORGE.

Witnesses:
JOSEPH T. PAGET,
CHARLES P. GEORGE.