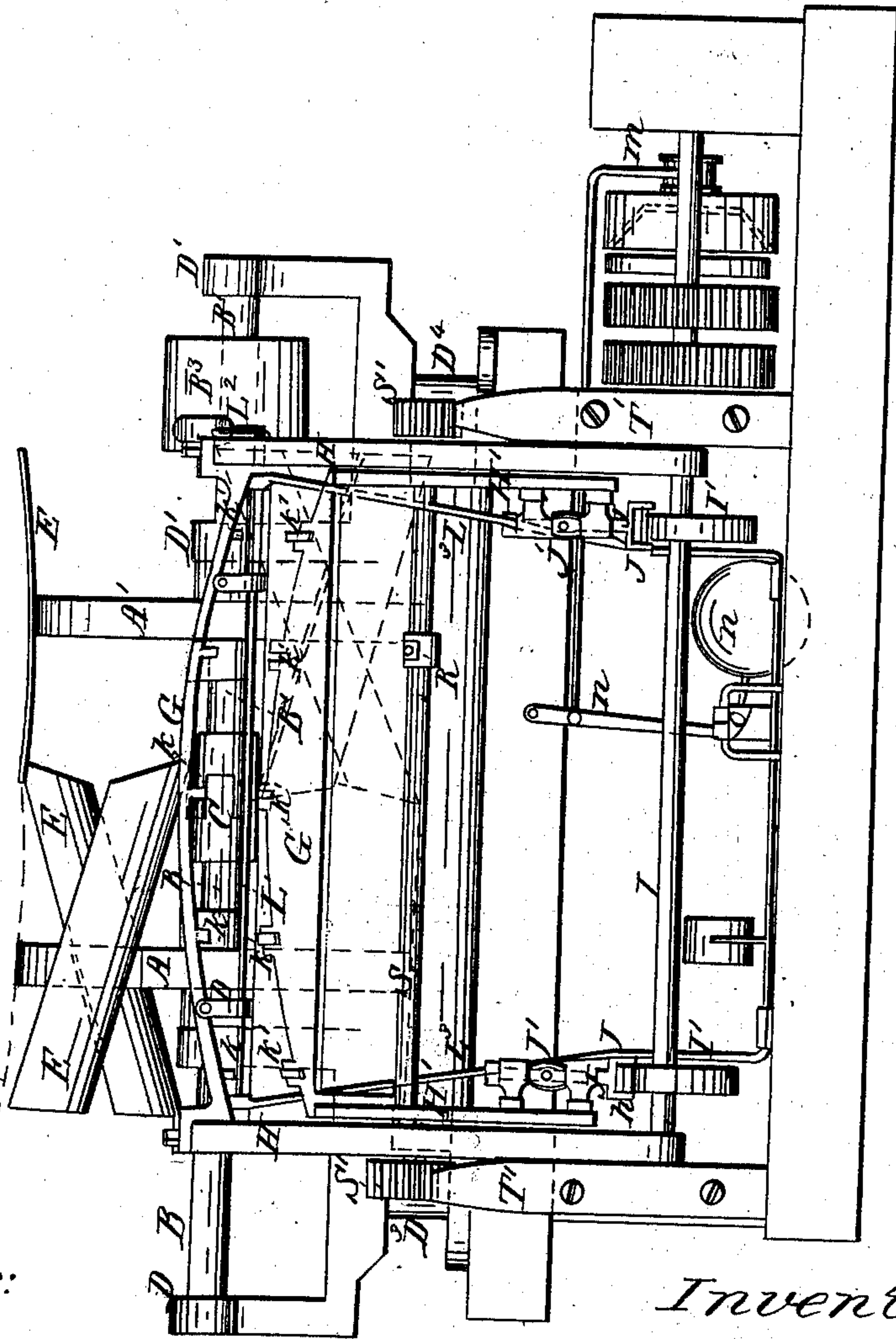


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E. & B. Holmes,
Jointing Staves.
N^o 80,483. Patented July 28, 1868.

Fig 1.



Witnesses:

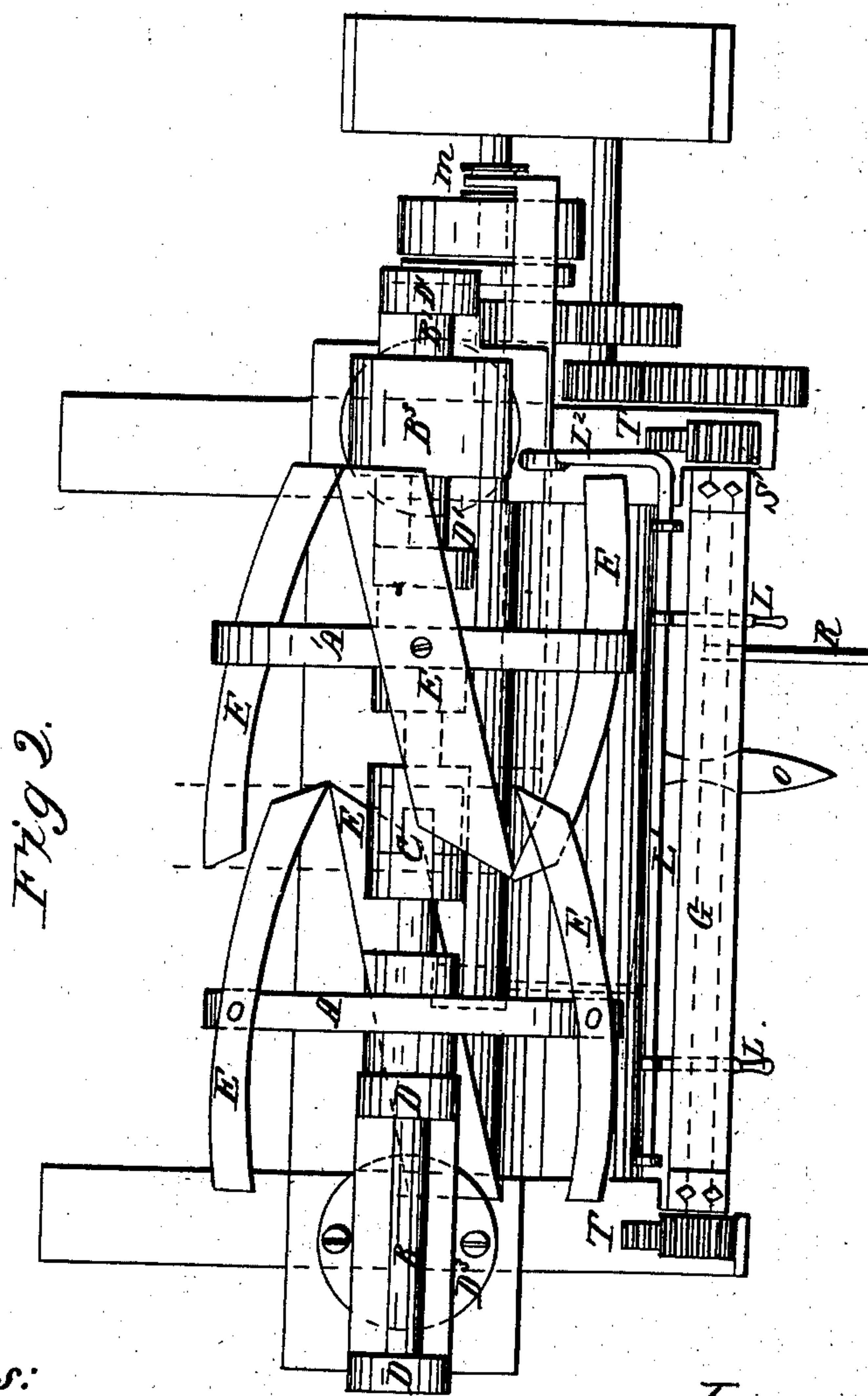
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Inventors:

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3 Sheets. Sheet 2.

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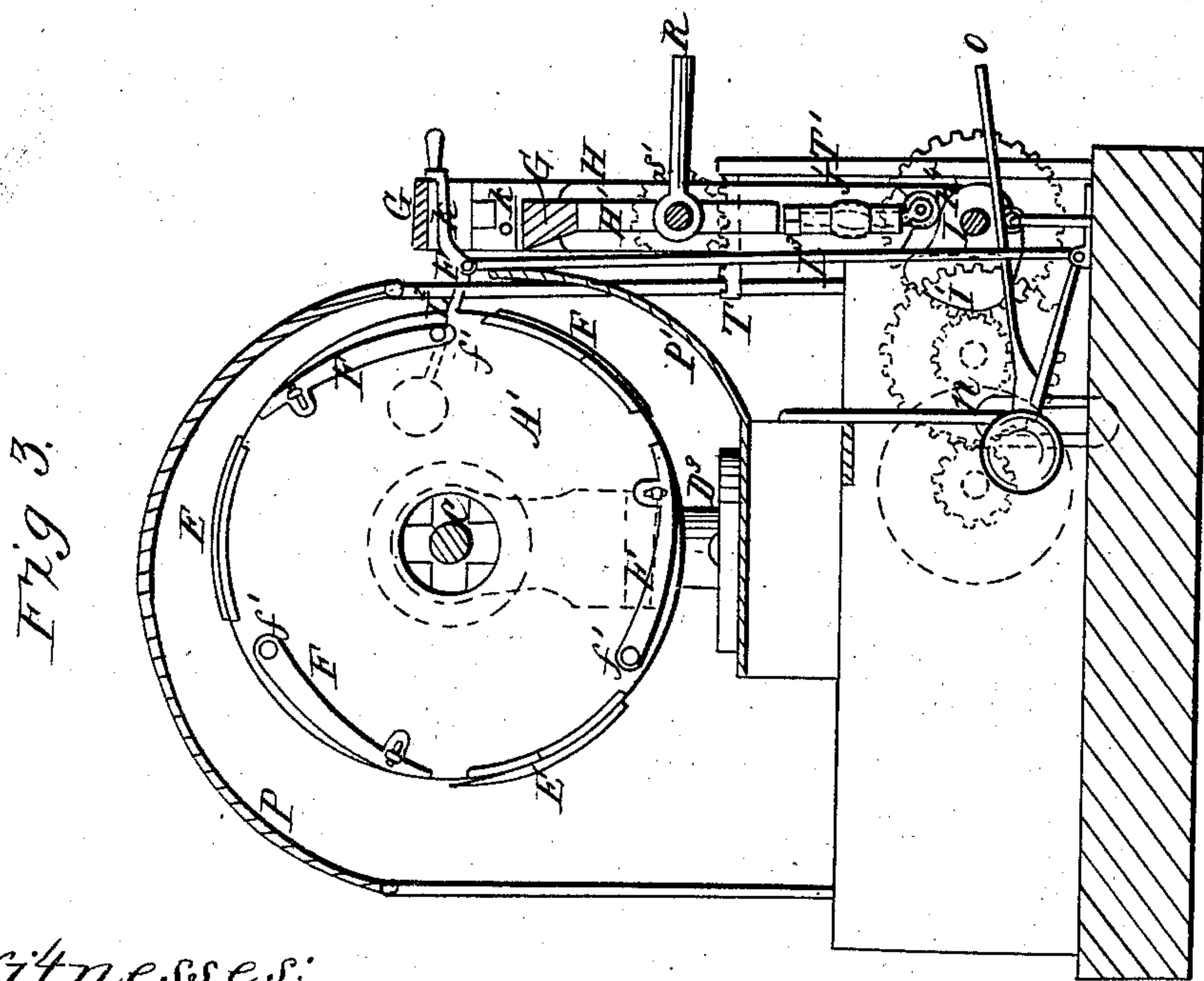
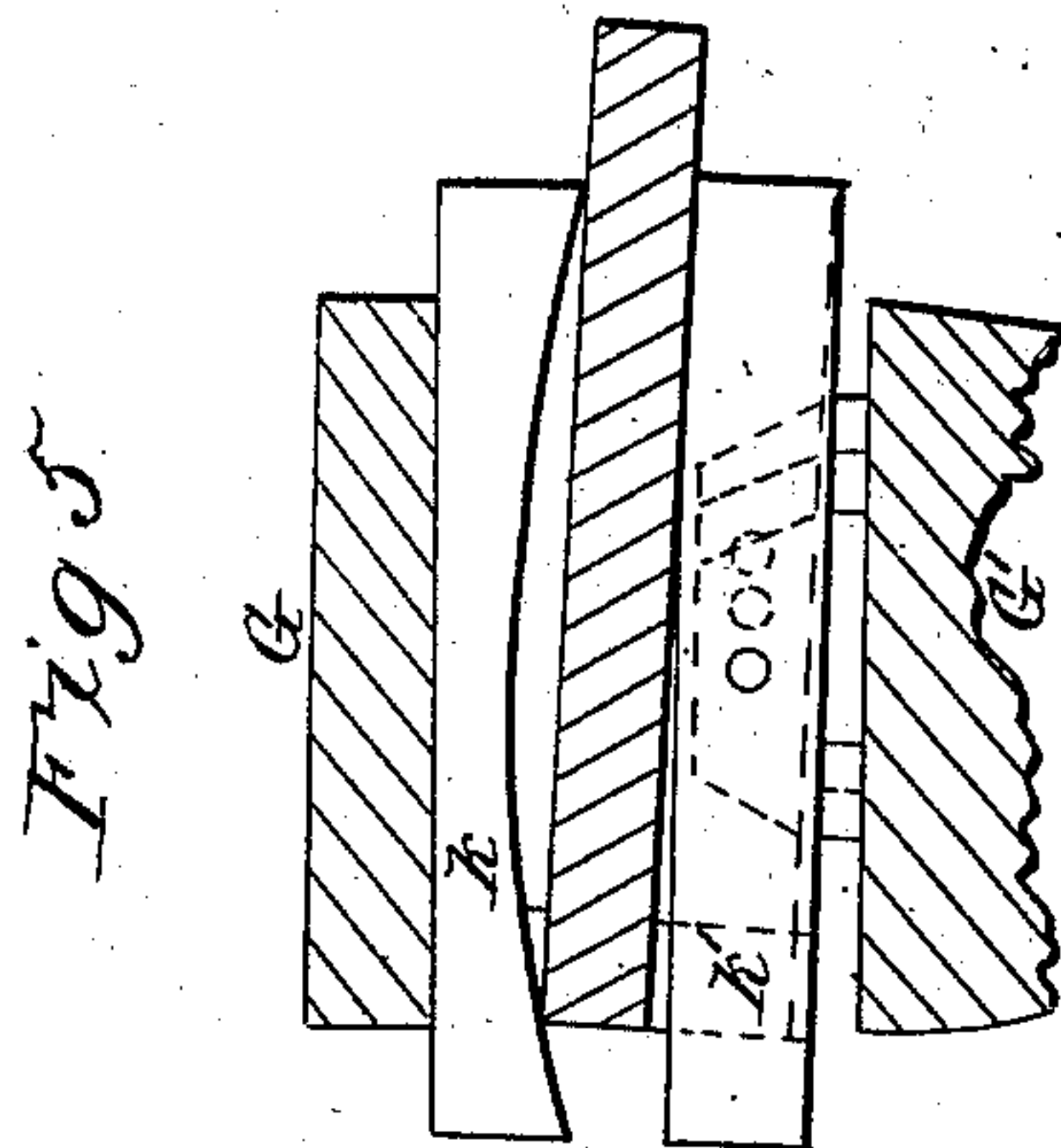
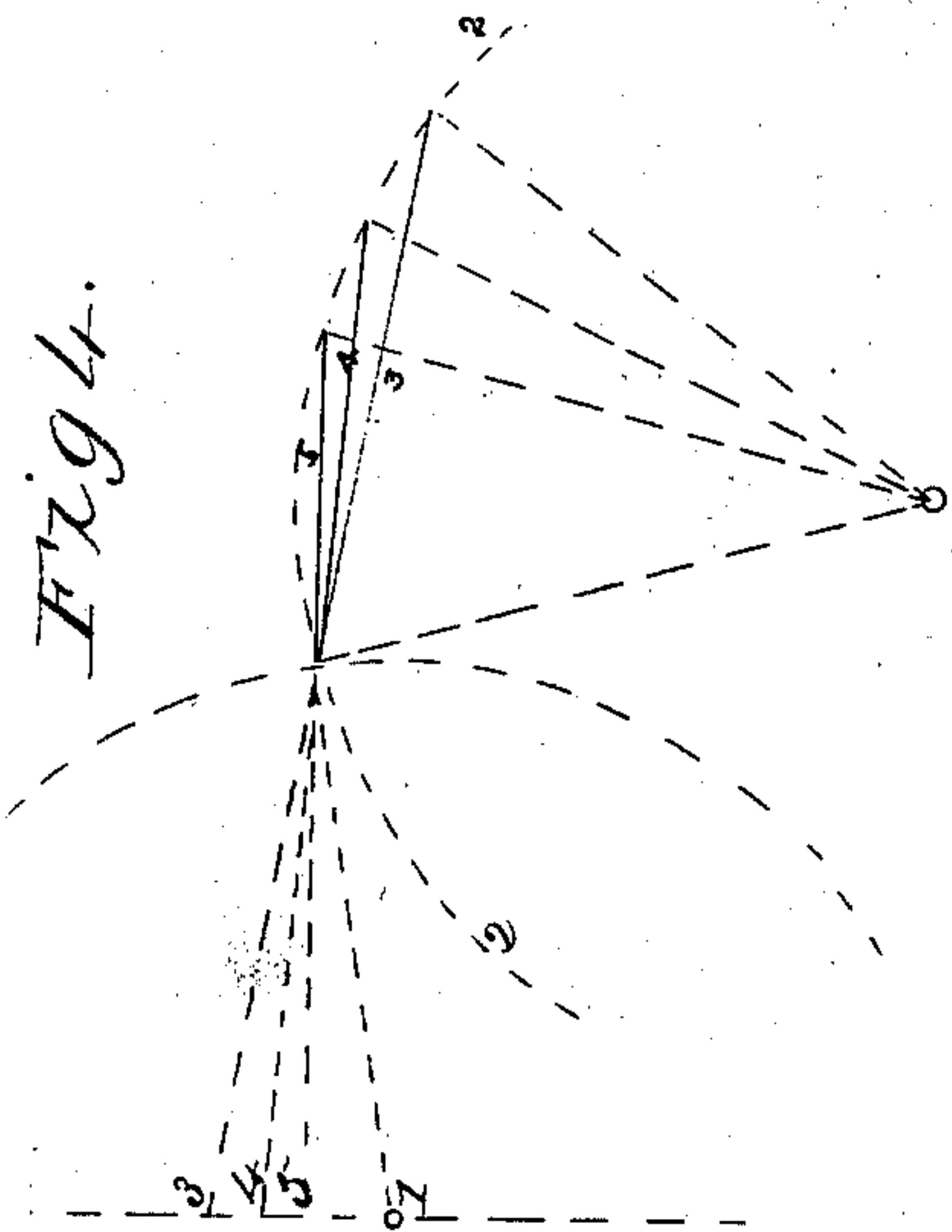
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UNITED STATES PATENT OFFICE.

EDWARD HOLMES AND BRITAIN HOLMES, OF BUFFALO, NEW YORK.

IMPROVEMENT IN MACHINES FOR JOINTING STAVES.

Specification forming part of Letters Patent No. **80,483**, dated July 28, 1868.

To all whom it may concern:

Be it known that we, EDWARD HOLMES and BRITAIN HOLMES, of the city of Buffalo, county of Erie, and State of New York, have invented a certain new and Improved Stave-Jointing Machine; and we do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawings, making a part of this specification, in which—

Figure I is a side elevation. Fig. II is a top plan view. Fig. III is a sectional end elevation. Figs. IV and V are diagrams illustrating the construction of some parts of the machine.

The nature of this invention consists, first, in providing the lower clamp-bar with several series of transverse ribs of equal depth but varying length, each piece being hinged at its center independently of the others, in combination with a transverse curvature in the upper clamp-bar, so that staves of different width will be held at different angles, as will be more fully described, in order to present them to the cutters in a manner to give them the required bevel and bilge due to their widths; second, in two feed-arms or eveners supported upon a rock-shaft and pressed against the under side of the upper clamp-bar by means of a weighted arm attached to the said rock-shaft for the purpose of feeding the staves evenly to the action of the knives in a manner to make the ends of the staves of equal width; third, in the combination of a friction-clutch, weighted lever, and pedal, by which means the gearing which operates the clamp may be stopped instantaneously whenever required; fourth, in the combination and arrangement of a rock-shaft carrying pinions or segments upon each end, which gear with stationary racks in such manner that by taking hold of an arm connected to said shaft the same may be revolved for the purpose of operating the clamp, and thereby feeding the staves to the action of the cutters.

Letters of like name and kind refer to like parts in each of the figures.

A A' represent the cutter-heads, supported upon the shafts B B' in line with or slightly inclined to each other, said shafts being coupled together at their contiguous ends by a universal joint, C, and having their bearings in double pillow-blocks D D', which are sup-

ported upon turn-table pedestals D³ D⁴, or equivalent devices, the construction of which permits the angle of the shafts to be increased or diminished, as desired.

B³ is a pulley upon the shaft B', by means of which the shafts and cutter-heads are revolved with the required velocity. The cutter-heads may be made in the shape of complete drums or cylinders, or of segments thereof, supported by rims, said segments being of the proper size and form to receive and hold the cutting-knives.

E represents the knives, secured by bolts to the cutter-heads, their cutting-edges being inclined at an angle to the line of motion from their contiguous ends to their outer ends, so that they may strike the stave at the center and pass through with a drawing cut to the ends thereof. The knives of one head are placed in advance of those of the other, so that their contiguous ends overlap each other, as shown in Fig. II, to give an unbroken cut over the whole length of the stave. The knives have a longitudinal curvature—such that radial lines drawn from different points of their cutting edge gradually increase in length from their contiguous ends (or center of the heads considered as a whole) to their outward ends—which curvature is such as to give the required bilge to the staves. The knife-seats on the heads are of course formed with a corresponding curvature. The knives are bolted to the heads, with the bevel upon the inside, and their outer surface is turned concentric with the axis of the heads, so that it acts on a guard to prevent the knife from drawing into the stave and avoid increasing the thickness of cut as it passes through the stave.

Adjustable guards F are placed upon the face of each cutter-head, which determine the thickness of cut the knives are allowed to make. They consist of a curved bar, hinged at one end, as shown at f', Fig. III, and the other end projecting to within close proximity of the cutting-edge of the knives.

The clamp which holds the staves in their presentation to the cutters consists of an upper bar, G, which is stationary, and a lower bar, G', which is movable, so that the clamp may be opened to receive the stave and closed to hold it firmly while being presented to the action of the cutters. The clamp is placed longitudi-

nally parallel to the axis of the cutter-heads, and is supported upon the swinging arms H, hinged to the shaft I, which allow the clamp a movement at right angles to the axis of the cutters. The clamp-bars are given a longitudinal curvature, the upper one concave and the lower one convex, so that the stave is bent in clamping, which will hold it more securely and firmly than if it were clamped straight. The upper clamp-bar has also a slight transverse twist from its center toward each end, which will throw the ends of the stave forward toward the cutter-heads sufficiently to compensate for that portion of the circle of heads it takes up in bending. The upper clamp-bar is bolted at its ends to the arms H, and the lower clamp-bar to arms H', moving in guide-grooves upon the inside of the arms H. The lower ends of the arms are provided with a sliding socket, J, which passes through ears projecting from the sides of the arms, and has a rubber spring, J', inserted between them, which springs will yield to accommodate varying thicknesses of staves. The socket-extensions carry upon their lower ends friction-rollers k^4 , which ride upon cams I', keyed upon the shaft I, which cams by their revolution raise and lower the lower clamp-bar to open and close the clamp. The shaft I is driven by gear of such proportions as will give the cams the required velocity to operate the clamps a certain number of times per minute, which number will be the number of staves the machine is capable of jointing. The cams must be made of such form as will hold the clamp closed long enough for the stave to be fed up to and back from the cutters, and then open and hold it open long enough for the jointed stave to be removed and a new one inserted. The closing movement should be slow and powerful.

Staves of different widths require to have different bilge and bevel given thereto. Supposing the stave to be presented to the cutters with the plane of its surface pointing to the axis of the cutters, it would receive no bevel, but its edge would be cut at right angles to its surface. The stave consequently requires to be so inclined that the plane of its surface shall point above the axis of the cutter-heads according to its width—more for a wide stave, which requires more bevel, and less for a narrow stave, which requires less bevel. This is accomplished by the action of the stationary rests or ribs k upon the under side of the upper clamp-bar, G, and the movable rests or ribs k' upon the upper side of the lower clamp-bar, G', in the following manner: The under side of the ribs k has a transverse curvature, so that a stave being placed in the clamp with its front edge coincident with the front edge of the clamp, or rather in advance of the same sufficient to allow for jointing, will assume the position of the chord of an arc of said transverse curvature, the length of said chord being the width of the stave, so that staves of different widths will form chords of different lengths.

Consequently, the transverse curvature of the said ribs or rests k bearing such relation to the cutter-heads that the chord of its whole arc prolonged will strike above the axis of the cutter-heads a distance necessary to give the required bevel to the widest stave, the chord of any lesser arc of the transverse curvature (measuring from the common point of the front edge of the clamp-bar) will strike nearer the axis of the cutter-heads and in exact proportion to the length of said arc, so that the inclination of the stave will always be governed by its width and in a manner to give it the required bilge due to its width. The operation of this transverse curvature in varying the inclination of the stave in proportion to its width is further illustrated by the diagram Fig. IV, in which 1 represents the center of the cutter-heads; 2, the whole arc of the transverse curvature; 3, the chord of same prolonged and striking above said point; 4 5, chords of lesser arcs of transverse curvature prolonged and gradually striking nearer the point 1 as they decrease in length.

To prevent the closing of the clamp from forcing and bending the stave into the transverse curvature of the upper ribs, k , which would be likely to split the stave, besides destroying the efficiency of the curvature in regulating the angle of the stave, we provide the lower clamp-bar, G', with the several series of rib-pieces, k' , of equal depth, but those of each series or set being of different length, and each piece being hinged independently of the others at its center, as represented at Figs. III and V. These rib-pieces will assume such positions or inclinations as the curvature of the upper bar gives the stave, as before described, and will clamp the stave to said bar only at its edges, so that any tendency to bend or split the same is avoided. The different lengths of the rib-pieces accommodate for and insure this action in different widths of staves.

In feeding the staves for the jointing of the first edge they do not require to be placed in the clamp with any great degree of accuracy, it only being necessary that they should project far enough in advance of the clamp-bar to allow sufficient stock for the action of the knives; but in jointing the second edge they require to be fed with great accuracy to insure the stave being of equal width at each end. For this purpose we provide two feed-arms, L, supported upon a rock-shaft, L'. This rock-shaft is parallel with the clamp and the axis of the cutter-head, and located between both. The arms L project forward below the upper clamp-bar, and the rock-shaft L' is provided with a weighted arm, L², in such manner that the feed-arms rest against the under side of the upper clamp-bar. Each feed-arm is so bent as to form a notch or shoulder upon its upper side, which answers the purpose of a guide against which the stave may be fed to insure its being made of equal width at each end, as above stated. The rock-shaft is supported by

the long radius-arms L^3 , which allow it to move to and from the cutters in feeding the stave.

The clamp is moved up to the cutter-heads by means of the arm connected to the rock-shaft S, which shaft is supported in bearings in the clamp-arms H and carries upon its ends the pinions or segments S' , which gear with the horizontal racks T upon the standards T' . By taking hold of the arm R the shaft may be made to rock in a manner to either rush the clamp forward or draw it back whenever it becomes necessary to do so.

m represents a friction-clutch, by which the gearing which operates the clamp is connected to the driving-pulley. This clutch is made self-adjusting by means of the weighted lever n , which retains it in constant contact with the driving-pulley.

O is a pedal-lever hinged upon its center, and having an inclined plane or bevel formed upon its back, and which is in close proximity with the weighted lever n . By pressing with the foot upon this pedal the operator may easily and quickly lift the weight, disengage the clutch, and hence stop the driving-gear of the clamp whenever it becomes necessary to do so.

$P P'$ are guards, made of sheet metal or wood, which surround the cutter-heads for the purpose of preventing accidents.

What we claim as our invention, and desire to secure by Letters Patent, is—

1. The flexible hinged ribs k' , in combination with the stationary ribs k , constructed, arranged, and operating for the purpose and substantially as described.

2. The eveners or feed-arms L, for the purpose substantially as set forth.

3. The combination of the friction-clutch m , weighted lever n , and pedal O, arranged and operating in the manner substantially as described.

4. The combination of the horizontal rack T, pinion or segment S' upon the rock-shaft S, and arm R, arranged and operating for the purpose and substantially as described.

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BRITAIN HOLMES.

Witnesses:

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EDWARD WILHELM.