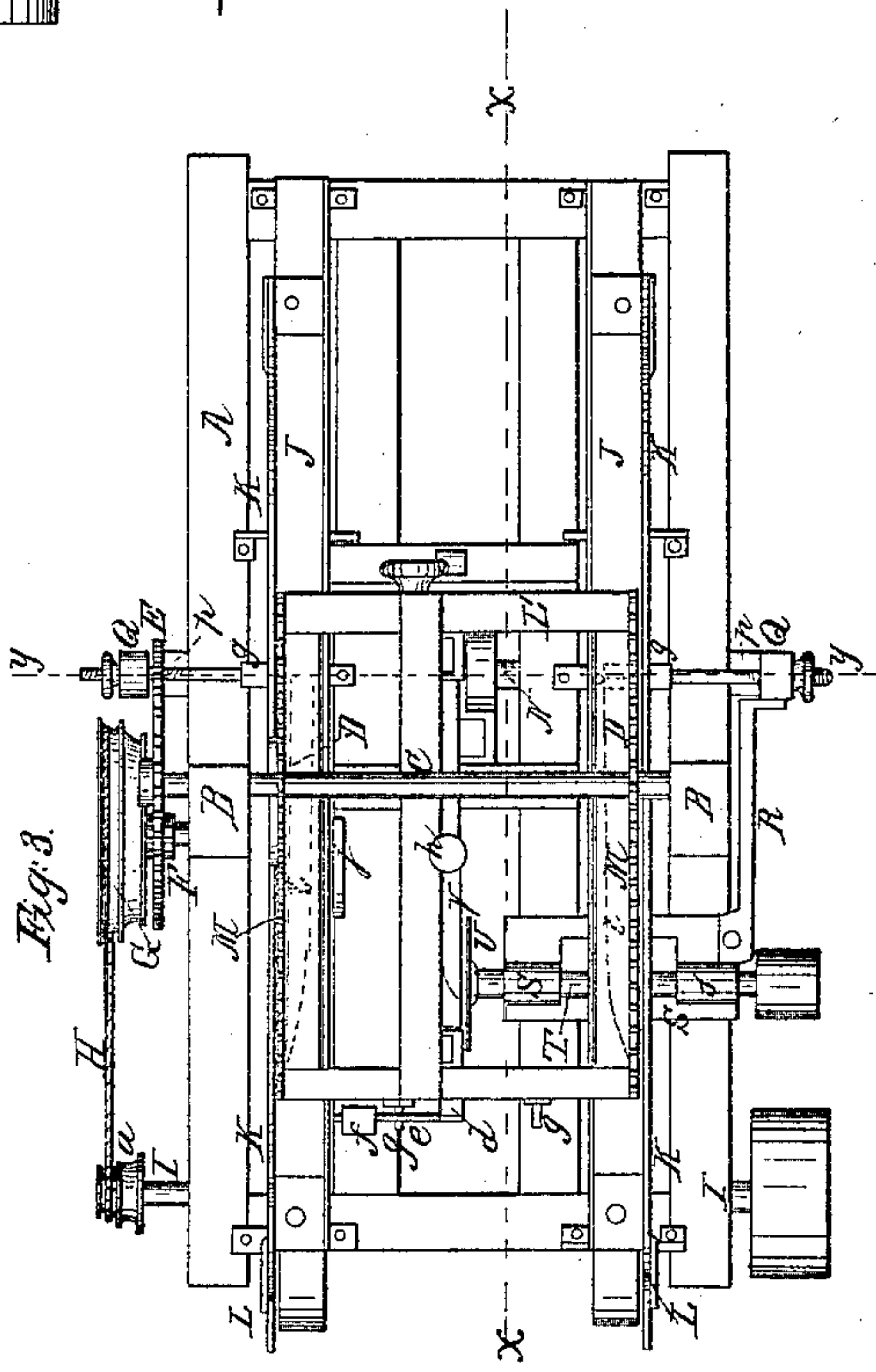
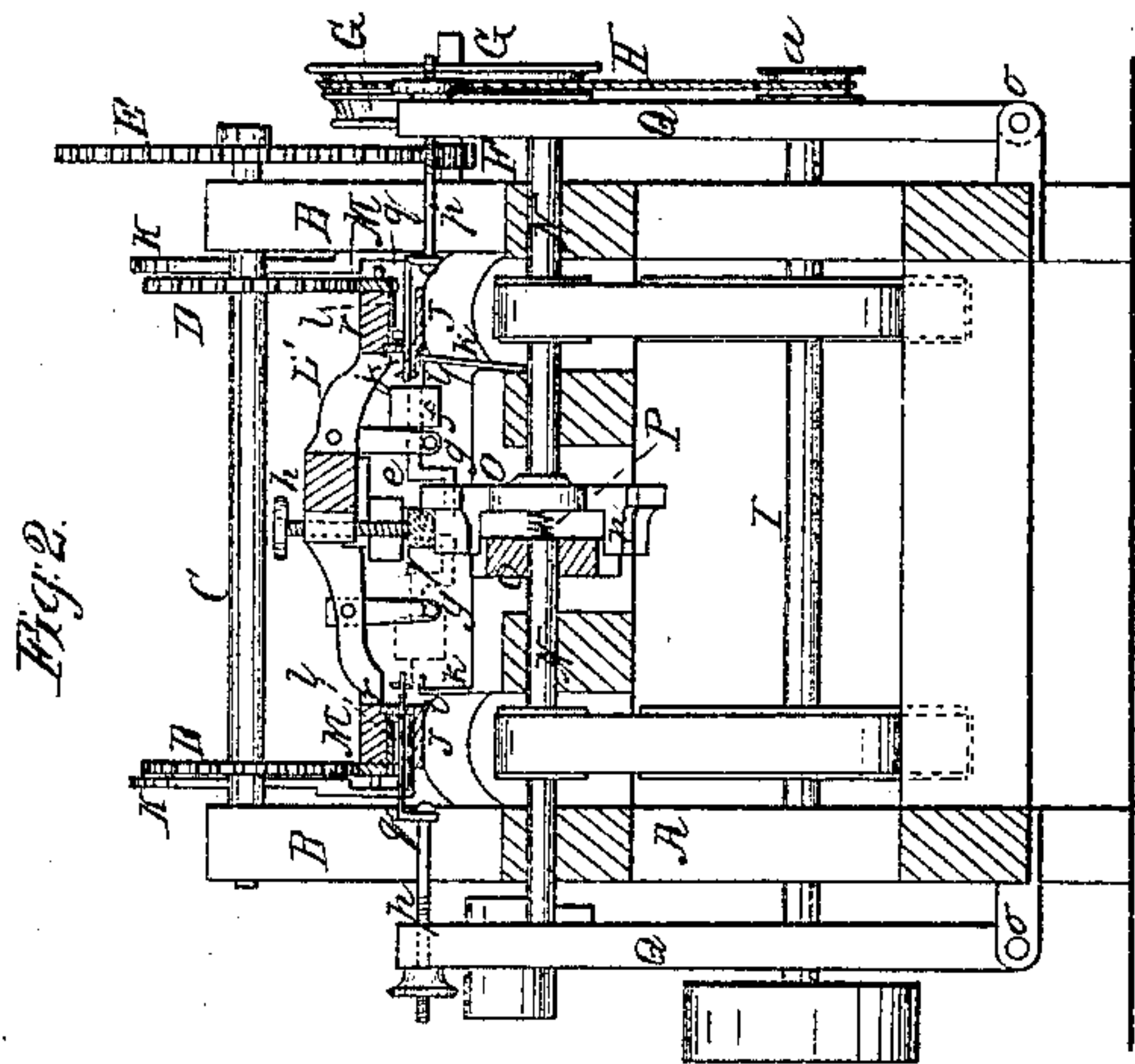
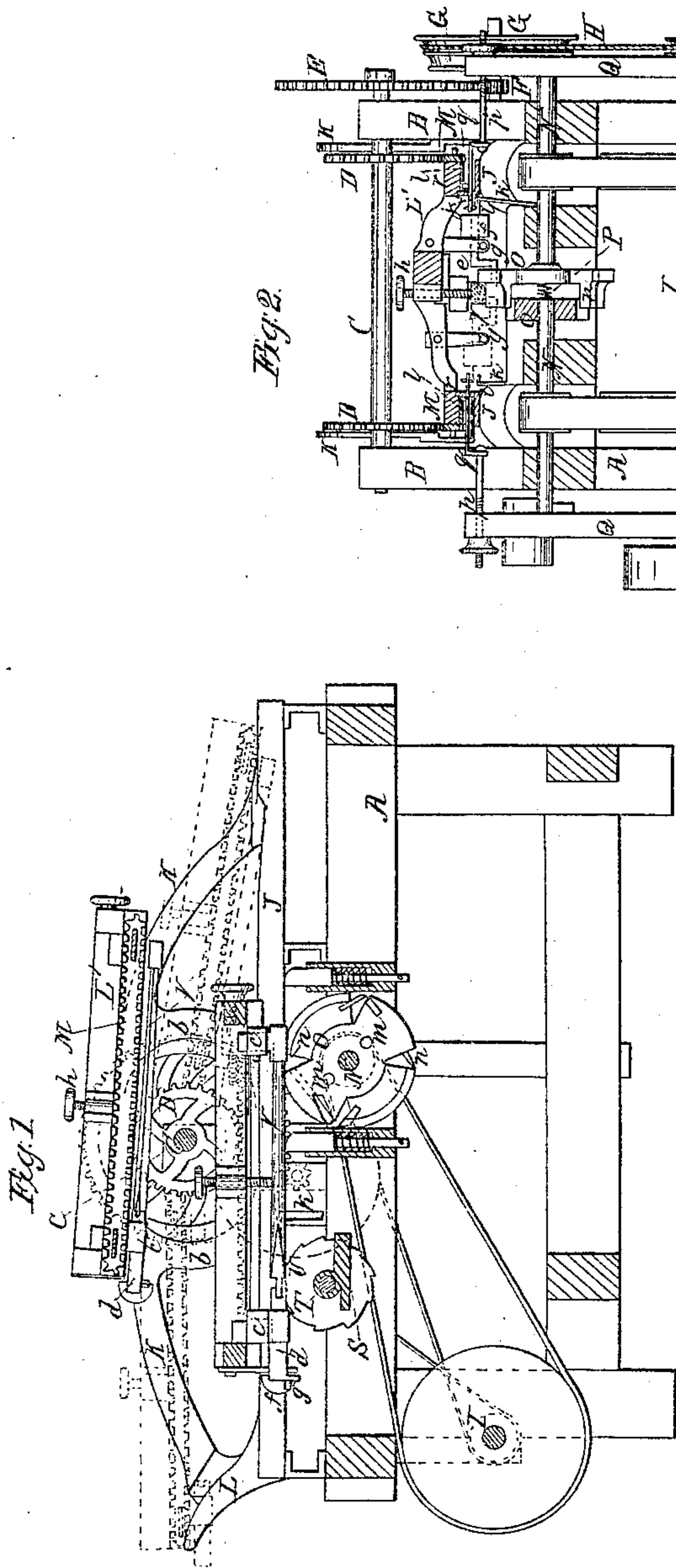


Knight & Rice, Spoke Machine.

N^o 21,886.

Patented Oct. 26, 1858.



UNITED STATES PATENT OFFICE.

L. L. KNIGHT AND D. H. RICE, OF BARRE, MASSACHUSETTS.

SPOKE-MACHINE.

Specification of Letters Patent No. 21,886, dated October 26, 1858.

To all whom it may concern:

Be it known that we, LUKE L. KNIGHT and DANIEL H. RICE, of Barre, in the county of Worcester and State of Massachusetts, have invented a new and Improved Machine for Making Spokes; and we do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the annexed drawings, making a part of this specification, in which—

Figure 1, is a side sectional view of our invention taken in the line *x, x*, Fig. 3. Fig. 2, is a transverse vertical section of ditto taken in the line *y, y*, Fig. 3. Fig. 3, is a plan or top view of ditto.

Similar letters of reference indicate corresponding parts in the several figures.

This invention consists in the employment or use of two carriages in connection with a proper cutting tool or tools arranged and operated substantially as hereinafter shown and described, whereby when the machine is in full operation two spokes are in course of construction at the same time, the desired work produced in a rapid and perfect manner and a very simple machine obtained.

To enable those skilled in the art to fully understand and construct our invention we will proceed to describe it.

A, represents a rectangular frame which may be constructed in any proper way to support the working parts.

B, B, are two uprights attached one to each side of the frame at its upper part, said uprights forming bearings for a shaft C, near each end of which a toothed wheel D, is placed. On one end of the shaft C, a toothed wheel E, is placed, and this wheel gears into a pinion F, which is attached to a pulley G, said pulley being driven by a belt H, from a pulley *a*, on the driving shaft I, which is placed at one end of the frame A. On the upper part of the frame A, two ways J, J, are placed parallelly and longitudinally, one near each side of the frame, see Fig. 3. The ways J, J, extend the whole length of the frame and each way J, has a curved bar K, attached to it, said bars at one end of the machine extending upward from the outer ends of the ways to a plane a trifle above the tops of the wheels D, and at the other end of the machine extending upward to the same plane from curved guides L, which are connected with the ways. The bars K, do not

extend as far as the wheels D, D. A space is allowed all around them, the inner supports *b*, being placed sufficiently distant from the wheels for such purpose, see Fig. 1.

L', L', are two frames which work between the ways J, J, and the bars K, K. Each frame L', has an endless rack M, at each end of it, and the wheels D, D, gear into these racks at opposite points of their peripheries so as to give reverse movements to the two frames. This will be clearly understood by referring to Fig. 1. To the under side of each frame L', L', two pendants *c, c'*, are attached. In one pendant *c'*, of each frame, one end of the stick to be operated upon is placed, and the other pendant contains a swivel *d*, in which the opposite end of the stick is attached, see Fig. 1. The swivels *d*, have arms *e*, attached to their outer ends, each arm having a weight *f*, attached to it. The arms *e*, are supported in a horizontal position at either side of their swivels by pendent supports *g, g*. Each frame L', has a set screw *h*, at its center to serve as a bearing for the sticks when the cutters act upon them as will be hereinafter described. The outer end of each arm *e*, is forked as shown at *i*, Fig. 2, and on the frame A, near the inner side of each way J, a curved bar *j*, is placed, said bars being at the upper ends of uprights *k, k*. To the under side of each frame L', at each side a taper or oblique bar or plate *l*, is placed. These bars or plates extend nearly the whole length of the frames. They are shown clearly as regards position or form by the dotted lines in Fig. 3.

N, N, are two shafts which are placed transversely in the frame A, and which have a cutter head O, at each end, one cutter head having horizontal pins *m*, projecting from it and passing through holes in the opposite head. A spiral spring P, is placed between the two heads O, O, said springs having a tendency to keep the heads distended, each shaft N, being allowed to slide in its bearings. Each head O, is provided with cutters *n*, said cutters being placed a little obliquely with the plane of their rotation in order to give a smooth clean cut to the stick.

To each side of the frame A, an upright lever Q, is attached as shown at *o*, Fig. 2. The upper ends of these levers have each a horizontal screw rod *p*, passing through them, and the inner ends of these screw rods

are attached to bars *g*, which work over the ways *J, J*, and have each an upright projection *r*, on them, see Fig. 2. To one end of the levers *Q*, a horizontal bar *R*, is attached, and this bar *R*, is attached to a sliding plate *S*, on which the bearings *s*, of a circular saw-mandrel *T*, are placed.

U, is the circular saw attached to the inner end of the mandrel. The mandrel *T*, is driven direct from the driving shaft *L*, and the shafts *N, N*, of the cutter heads *O, O*, are also driven direct from the driving shaft *I*.

We would remark that the pendants *c'*, of each frame are attached to or suspended from screws which are fitted in the frames and so arranged that the pendants *c'*, may be moved or adjusted longitudinally in the frames to suit the length of the spokes to be turned.

The operation is as follows:—The sticks *V*, shown in red, and which are previously got out of proper size, are placed in the pendants *c'*, and swivels *d*, of the frames, and motion is given the shaft *I*, in any proper way. The wheels *D, D*, in consequence of gearing into the racks *M, M*, of the frames *L'*, at opposite points of their peripheries will move the frames *L'*, simultaneously in opposite directions and one frame *L'*, will be moved across the ways *J, J*, and its stick *V*, will have its under side cut by the cutters of the heads *O*, the latter being rotated from the shaft *I*, as previously stated. The heads *O*, are kept distended by the spring *P*, when not otherwise acted upon as previously stated and as the sticks *V*, pass over them the heads are gradually made to approach each other in consequence of the bars or plates *l*, acting against the projections *r*, and the under side of the spoke will be cut in taper form corresponding of course to the obliquity of the bars or plates *l*. As one frame is passing over the ways *J*, the other is passing over the bars *K*, one end, (the outer end) of the frame that is on the ways *J*, passing up the bars *L*, and the opposite and inner end passing up between the supports *b*, and the wheels *D, D*. Each frame as it passes up on the bars *K*, has its stick turned so that the opposite side may be cut at the succeeding passage over the ways *J, J*. Each frame it will be seen passes over the ways *J, J*, twice, as the cutters *n*, cut only a longitudinal half of the spokes at each passage of the stick over

them. The finished spokes are removed from the frames and sticks placed in them as the frames pass from the ways up to the bars *K*. The saw *U*, cuts the sides of the spoke adjoining the butt or tenon, giving it a flat surface, the saw being moved simultaneously with the heads *O*, so that it will be in proper position to give the cut as the butt reaches it, and be thrown back from the spoke as soon as its work is done. As the butts of the spokes pass over the cutters the forked ends of the arms *e*, catch on the curved bars *j*, and said bars slightly turn the sticks so that the spokes at one side only, the front side and adjoining the butts will be brought to an edge or be more angular than the other portions. This pattern or form of spoke is generally considered preferable, but if not desired in any case the bars *j* may be removed.

This machine is extremely simple and efficient. There are no parts liable to get out of repair and it will work rapidly and well. It has been practically tested and the work produced is smooth and even.

We are aware that expanding cutter heads have been previously used and arranged and operated in various ways, and we therefore do not claim separately the expanding cutter heads *O, O*, but

Having thus described our invention, what we claim as new and desire to secure by Letters Patent, is,

1. The employment or use of two carriages *L', L'*, in combination with expanding cutter heads *O, O*, or any proper cutting tool arranged to operate substantially as and for the purpose set forth.

2. We also claim the circular saw *U*, in combination with the expanding cutter heads *O, O*, when the parts are connected so as to operate conjointly as shown, to wit, as regards their lateral and rotating movements and used in connection with the carriages *L', L'*, for the purpose specified.

3. We further claim the loaded arms *e*, attached to the swivels *d*, the arms being forked at their outer ends and used in connection with the curved bars *j*, the whole being arranged substantially as and for the purpose set forth.

LUKE L. KNIGHT.
D. H. RICE.

Witnesses:

EDWIN WOODS,
HARDING P. WOODS.