(No Model.) 3 Sheets—Sheet 1.

J. F. WELCH.

WOOD PLANING MACHINE.

No. 393,948. Patented Dec. 4, 1888.

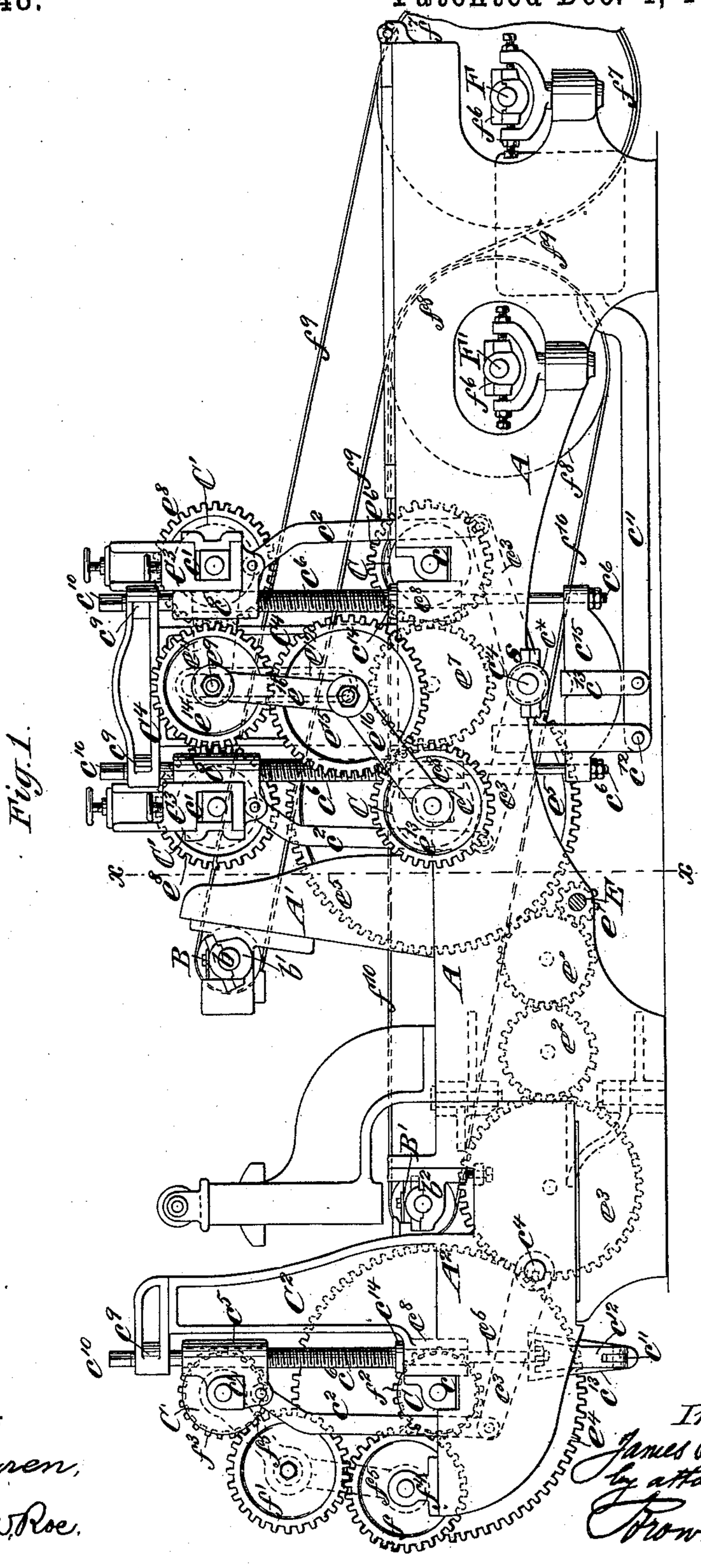

Fig. 1.

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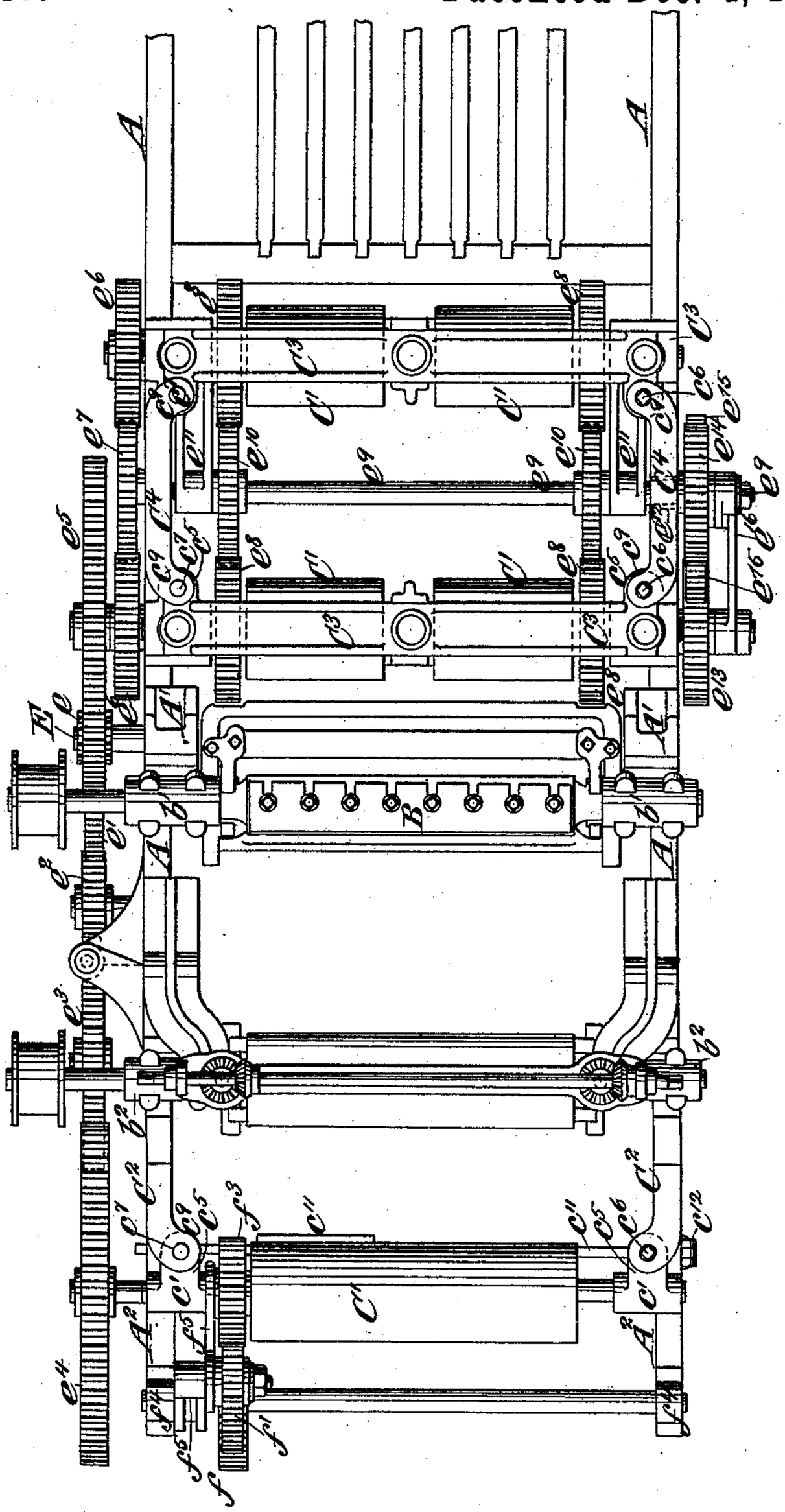

Fig. 2.

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Fig. 4.

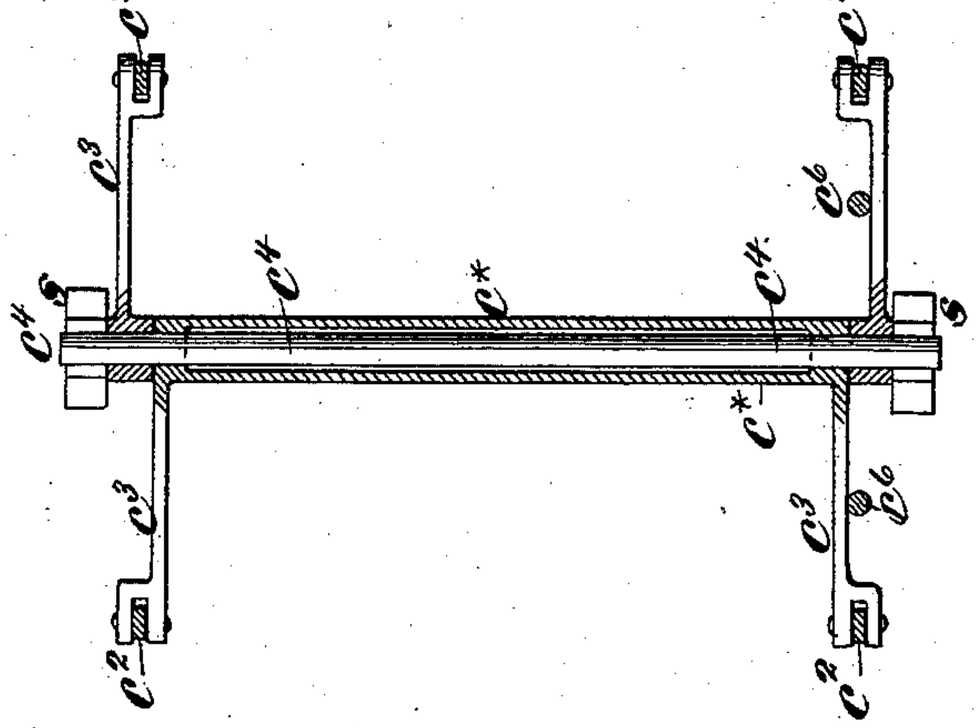
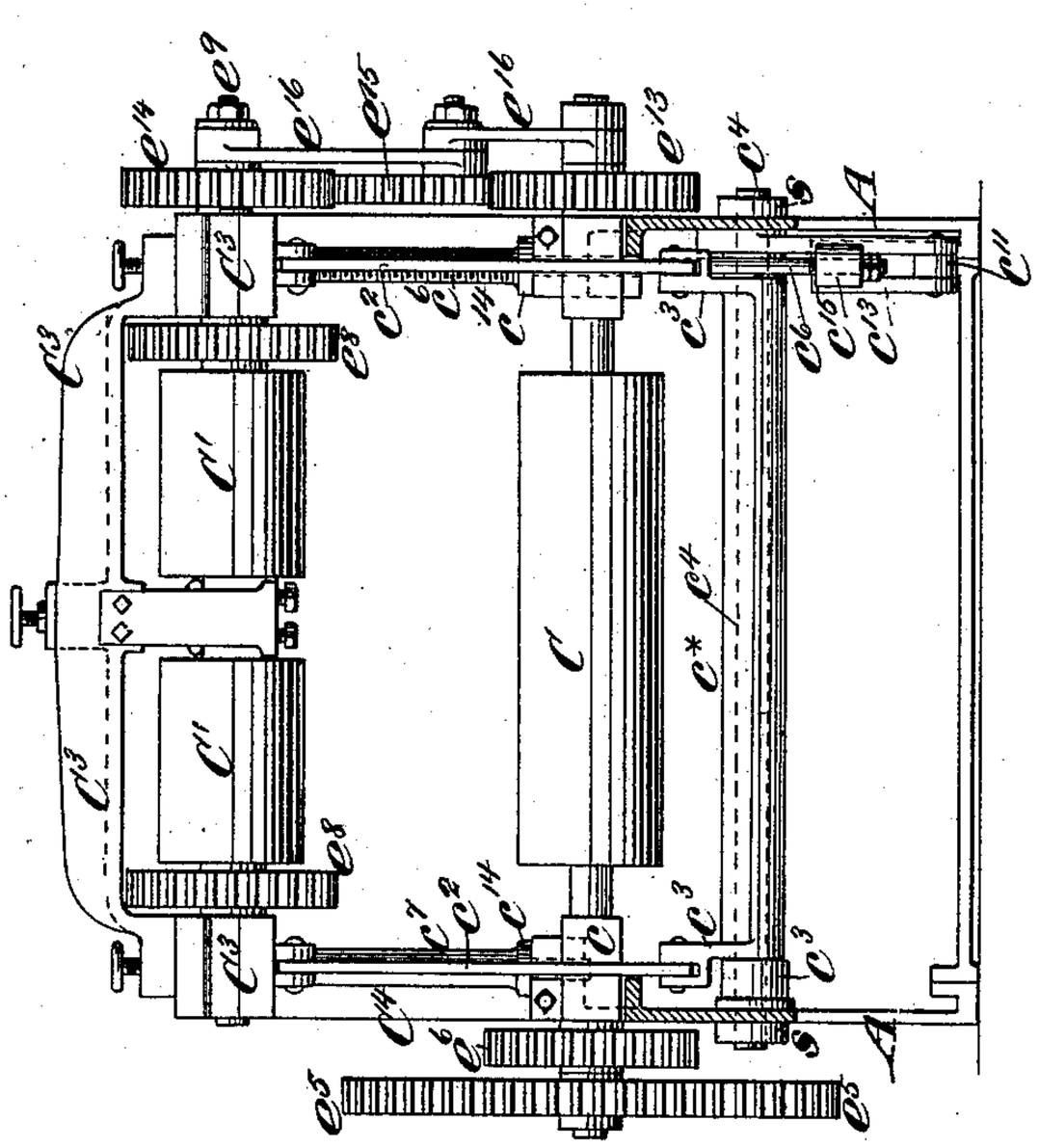


Fig. 3.



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UNITED STATES PATENT OFFICE.

JAMES F. WELCH, OF BROOKLYN, NEW YORK, ASSIGNOR TO THE GLEN COVE MACHINE COMPANY, (LIMITED,) OF SAME PLACE.

WOOD-PLANING MACHINE.

SPECIFICATION forming part of Letters Patent No. 393,948, dated December 4, 1888.

Application filed July 3, 1888. Serial No. 278,960½. (No model.)

To all whom it may concern:

Be it known that I, JAMES F. WELCH, of Brooklyn, (Green Point,) in the county of Kings and State of New York, have invented a new and useful Improvement in Wood-Planing Machines, of which the following is a specification, reference being had to the accompanying drawings.

This invention, although generally applicable to wood-planing machines, is particularly useful in the class of wood-planing machines which are termed "surfacing-machines."

The improvement consists in means, hereinafter described and claimed, for supporting and adjusting upward and downward the top roll of each pair of feed-rolls in the machine, and in the gearing, hereinafter described and claimed, for imparting motion to each upper roll, notwithstanding its upward and downward movement produced either by adjustment or by rising as the lumber passes under it.

In the accompanying drawings, Figure 1 is a side elevation of a surfacing-machine embodying my invention. Fig. 2 is a plan of the same. Fig. 3 is a sectional elevation upon about the plane indicated by the dotted line $x\ x$, Fig. 1. Fig. 4 is a horizontal section of two rock-shafts with which the upper feed-rolls of two pairs are connected, as will be hereinafter described.

Similar letters of reference designate corresponding parts in all the figures.

A designates the main frame of the machine. B B′ designate the cutter-heads, and C C′ designate the feed and delivery rolls. The upper cutter-head, B, has its journal b supported in bearings b', adjustable upward and downward upon standards A′, erected upon the main frame. The lower cutter-head, B′, is represented as supported in bearings b^2 in a supplemental end frame, A^2; but this supplemental end frame constitutes no part of the present invention, and for the purpose of this invention it is immaterial whether the bearings b^2 of the lower cutter-head, B′, are upon the main frame or upon a supplemental frame.

Two pairs of feed-rolls are represented and one pair of delivery-rolls, each pair consisting of a lower roll, C, and an upper roll, C′. The two pairs of feed-rolls are represented upon the main frame A, and the pair of delivery-rolls are represented upon the supplemental frame, though for the purposes of the present invention all the feed and delivery rolls might be upon one main frame.

The feed and delivery rolls are all represented as driven from a shaft, E, which works in bearings in the main frame, which carries a pinion, e, which gears into a wheel, e', which latter gears into another wheel, e^2, which in turn transmits motion to a wheel, e^3, and the wheel e^3 is in gear with a large wheel, e^4, on the lower delivery-roll, C.

The lower delivery-roll is journaled in bearings c; but the bearings c' of the upper delivery-roll, C′, are vertically movable, and are connected by rods c^2 with arms c^3 upon the rock-shaft c^4, working in fixed bearings. Consequently as the upper roll, C′, rises and falls it is by the rock-shaft c^4 constantly maintained in parallel position with the lower delivery-roll, C. The boxes c' here constitute the supports for the upper delivery-roll, C′, and are provided each with a socket, c^5. These sockets c^5 of the boxes c' at opposite ends of the roll, respectively, receive through them cylindrical rods c^6 c^7. These rods are supported at their lower ends in bearings c^8, and at their upper ends are supported in bearings c^9 upon standards C^2, erected upon the framing.

As planing-machines have ordinarily been constructed, the boxes or supports for the upper feed-roll are guided directly upon the roll-stands; but in carrying out my invention these boxes or supports are preferably guided and sustained in position solely by the vertical rods c^6 c^7. The rod c^7, which is shown only in Fig. 3, is simply a smooth cylindric post, upon which the socket c^5 on the box c' at that side of the machine slides; but the rod c^6 at the opposite side of the machine consists of a screw, and the socket c^5, which receives that rod, forms a nut fitting the thread of the screw. By means of a hand-crank applied to the upper end, c^{10}, of the screw-threaded rod c^6, which is squared for that purpose, the screw c^6 may be turned to raise and lower the

box with which it engages, and inasmuch as the boxes c' at opposite sides of the machine are connected by the rock-shaft c^4 and its arms and rods c^3 c^2 the two boxes c' at opposite ends of the roll will be raised and lowered in unison and the upper delivery-roll, C′, will always be maintained in position parallel with the lower roll, C.

The upper delivery-roll, C′, is weighted by means of a lever, c^{11}, which is fulcrumed at one end in a hanger, c^{12}, depending from that part of the frame in which the delivery-rolls are arranged. The said lever rests in a shackle or loop, c^{13}, supported by the lower end of the screw-threaded rod c^6. This weighted lever c^{11} extends transversely of the machine, and is shown in end view in Fig. 1 and in part in the plan view in Fig. 2. The weight which is thus applied through the screw c^6 to one of the boxes c' is through the connection of the two boxes at opposite ends of the roll with a rock-shaft, c^4, clearly applied to the other end of the roll, and when lumber passes under the upper roll, C′, it will rise equally at both ends, and will lift the screw c^6 and the weight applied thereto. Upon the screw c^6 is a collar, c^{14}, which, by being supported upon the bearing c^8, prevents the downward movement of the box c', which is fitted upon it, and therefore prevents the upper roll, C′, from dropping down.

I have described how the motion is transmitted to the lower delivery-roll, C, and in order to transmit motion therefrom to the upper roll, C′, I provide expansion-gears f f', which are in gear, respectively, with gear-wheels f^2 f^3 upon the lower and upper rolls. The expansion-gear f is journaled in the fixed bearing f^4, and the gear f', which transmits motion from the wheel f to the wheel f^3, is supported by the swinging links f^5. This system of gears always transmits motion to the upper roll, C′, whatever be its vertical position.

At the front end of the machine, as shown in Fig. 1, are two cross-shafts, F F′, which are mounted in adjustable bearings f^6, and on which are pulleys f^7 f^8. From these pulleys f^7 f^8 motion is transmitted, respectively, to the upper cutter-head and the lower cutter-head, B′, by belts f^9 f^{10}.

As I have before stated, upon the main frame A are here represented two pairs of feed-rolls, each consisting of a lower roll, C, and an upper roll, C′. Each of the lower feed-rolls, C, is mounted in stationary bearings c, and each of the upper feed-rolls, C′, is what is usually termed a "broken roll," or, in other words, it is formed of two sections arranged end to end, as shown in Fig. 3. The boxes c', which support the sections of the upper roll, C′, are not directly supported upon rods or cylindric bars, as shown in the case of the delivery-rolls C C′, which are mounted upon the supplemental frame A^2; but the sections C′ of each upper feed-roll, which is upon the main frame A, are supported in an upper roll-frame, C^3.

The way in which the two roll-sections of each upper roll, C′, are supported in a frame, C^3, wherein they have a limited vertical movement independently of each other, I do not claim as my invention, as such features form the subject of an application for Letters Patent filed by A. B. Hutchinson and E. F. Autenrieth on January 30, 1888, and the serial number of which is No. 262,396.

Between the two pairs of feed-rolls C C′, and upon each main side frame, A, is a standard, C^4, and the upper roll-frames, C^3, are upon opposite sides of these standards. The boxes c' of the sections of the upper rolls, C′, having a limited vertical movement in the roll-frames C^3, are loaded by springs, as fully described in the aforesaid application of Hutchinson and Autenrieth. The upper roll-frames, C^3, may be considered as the supports for the upper rolls, and each frame C^3 has at opposite ends sockets c^5. The sockets c^5 at one side of the machine slide upon cylindric posts or rods c^7, and the sockets c^5 at the opposite side of the machine, which is represented in Fig. 1, form nuts, which receive and fit vertical screw-threaded rods c^6. The rods c^6 c^7 are fitted in lower bearings, c^8, and in upper bearings, c^9, which are carried by the standards C^4. The screws c^6 are provided with collars c^{14}, which form stops by striking against the bearings c^8 to arrest the downward movement of the roll-frames C^3, and when the upper feed-rolls, C′, and their frames C^3 are raised by the lumber the sockets c^5 on the said frames at one side of the machine rise upon their guiding-rods c^7, while at the opposite side of the machine the screws c^6 are lifted in their bearings. The upper roll-frames, C^3, are horizontally sustained and guided solely by the rods c^6 c^7, which fit the sockets c^5 at opposite ends thereof, and each upper roll-frame is connected at opposite ends by rods c^2 with arms c^3 upon two rock-shafts, c^4 c^*. These rock-shafts have a common center, as best shown in Fig. 4, and the shaft c is tubular and receives the rock-shaft c^4 through it. The rock-shaft c^4 is supported at its ends in bearings s upon the frame A, and close to these bearings are attached arms c^3, which are connected by the rods c^2 with the roll-frame C^3, which is at the right hand of Fig. 1.

The tubular rock-shaft c^* is loose upon the inner rock-shaft, c^4, and fills up the space between its arms, and this tubular rock-shaft c^* has at opposite ends the arms c^3, which are connected by rods c^2 with the upper roll-frame, C^3, at the left hand of Fig. 1. It will be understood that by the connection of each upper roll-frame, C^3, at its opposite ends with a rock-shaft, the two ends of that frame are caused to rise and fall in unison, and consequently the upper roll, C′, is normally maintain in parallelism with the lower roll, C.

The lower ends of the two screws c^6, which are upon the main frame A,are connected by a yoke, c^{15}, in which they are swiveled, so as to turn freely, and a weighted lever, c^{11}, is fulcrumed at c^{12}, and connected by a stirrup, c^{13}, with the yoke c^{15}. By this arrangement of parts and through the screws c^6 the two upper roll-frames, C^3, are weighted at their one end, and as opposite ends of each roll-frame are connected with a rock-shaft this weight is distributed upon both ends of the roll-frame.

From the feed-pinion e motion is transmitted, as before stated, to the wheel e', and this wheel e' gears into a large wheel, e^5, upon one of the lower feed-rolls, C. The two lower feed-rolls, C, are geared together by wheels e^6 upon their axes and an intermediate wheel, e^7, as shown by dotted lines in Fig. 1. The sections of the upper feed-rolls, C′, have upon them gear-wheels e^8, and the sections of the two upper rolls are geared together by an intermediate shaft, e^9, having wheels e^{10}, which gear into the spur-wheels e^8 on opposite sides. This shaft e^9 is supported in bearings e^{11}, which extend laterally inward from one of the upper roll-frames, C^3, and consequently as the upper roll-frames are raised or lowered by handles applied to the square ends of the screws c^6 the shaft e^9 will also be raised or lowered. The shaft e^9 is received in a slot, e^{12}, formed in one of the uprights or standards C^4, as shown by dotted lines in Fig. 1, and motion is transmitted from one of the lower feed-rolls, C, to the upper feed-rolls, C′, by expansion-gearing, which I will now describe.

Upon one of the lower feed-rolls, C, is a gear-wheel, e^{13}, and upon the shaft e^9 is a gear-wheel, e^{14}. With both these wheels engages an expansion-gear, e^{15}, which is supported by swinging links e^{16}. As the shaft e^9, with the wheel e^{14} upon it, rises and falls, the expansion-gear e^{15} is maintained in constant engagement with it and with the wheel e^{13} on the lower feed-roll, and hence motion is continuously imparted to the shaft e^9 and to the two upper rolls, C′.

I do not here claim the arrangement of the sections of the two upper rolls, C′, those of each roll in a separate upper roll-frame, C^3, and the intermediate shaft, e^9, which is geared with both sections of each upper roll, as such subject-matter is included in the aforesaid application of Hutchinson and Autenreith; but I do desire to include in my invention, broadly, the supports for the upper feed-rolls for the upper delivery-roll, having sockets which are fitted upon and solely supported and guided by rods at opposite sides of the machine, one of said rods of each pair being a screw and fitting a screw-thread in the socket in which it is received; and I also desire to include in my invention the combination,with the vertically-movable supports, of the upper roll-shafts of the two pairs of two rock-shafts, one being hollow and surrounding the other and having arms which are connected by rods with the upper roll-supports of the two pairs, whether these roll-supports consist of vertically-movable frames, as C^3, which support each the two sections of an upper feed-roll, or whether they consist of the movable boxes of upper feed-rolls, which are not sectioned or "broken."

What I claim as my invention, and desire to secure by Letters Patent, is—

1. The combination, in a wood-planing machine, of two pairs of feed-rolls, the lower rolls of the two pairs being mounted in stationary boxes and the upper rolls in vertically-movable supports, of two rock-shafts, one being hollow and surrounding the other, arms on said rock-shafts, and rods whereby the upper roll-supports of the two pairs are connected, respectively, with the arms on the two rock-shafts, substantially as herein described.

2. The combination, with a cutter-head, of a pair of feed-rolls, the lower roll being mounted in stationary bearings and the upper roll being journaled in supports connected at opposite ends of the roll by rods with the arms of a rock-shaft, and two guide-rods at opposite sides of the machine fitting sockets upon said upper-roll supports, whereby said supports are guided and solely sustained in all directions horizontally, one of said two rods being a screw and fitting a screw-thread in the one of said sockets in which it is received, substantially as described.

3. The combination, with two pairs of upper and lower rolls, of gearing connecting together the two lower rolls, a gear-wheel intermediate between the two upper rolls for driving both, a second wheel concentric and connected with said intermediate wheel, and an expansion-gear connecting the said second gear-wheel with a wheel on one of the lower rolls and journaled in swinging links, so as to transmit motion to the upper rolls whatever be their vertical position, substantially as herein described.

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