

No. 709,710.

Patented Sept. 23, 1902.

C. JOHNSON.

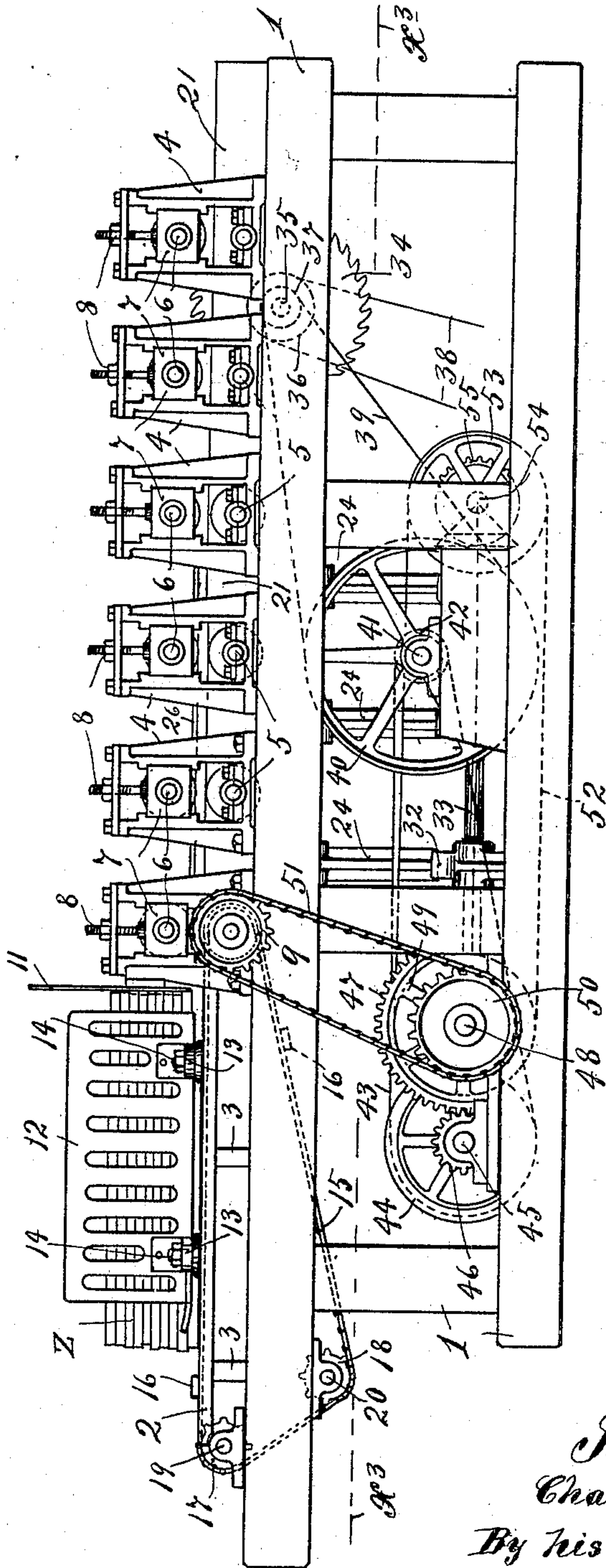
MACHINE FOR FORMING BLANKS FROM MATCHED BOARDS.

(Application filed Apr. 15, 1902.)

(No Model.)

5 Sheets—Sheet 1.

Fig. 1.



Witnesses
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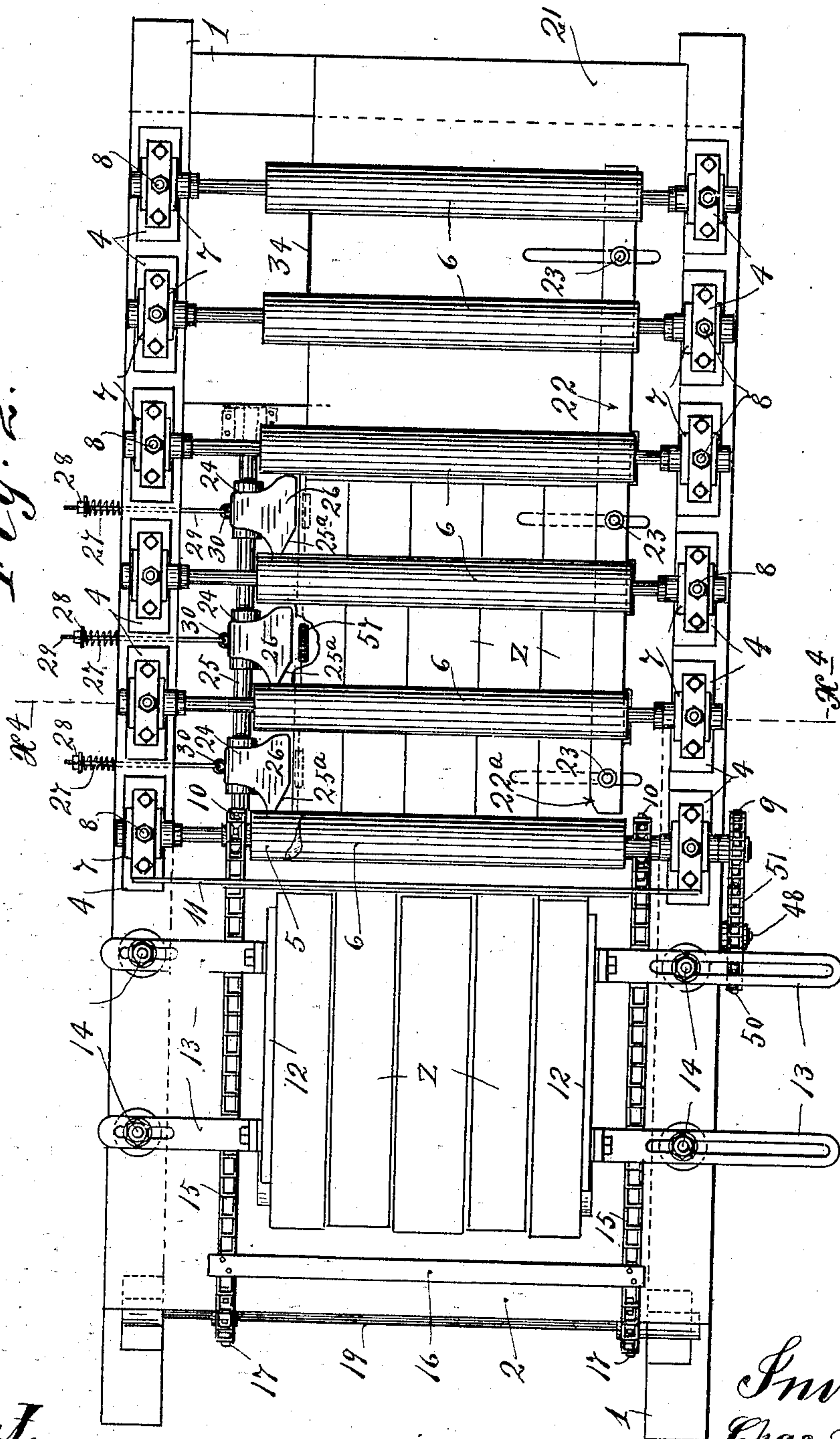
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Fig. 2.



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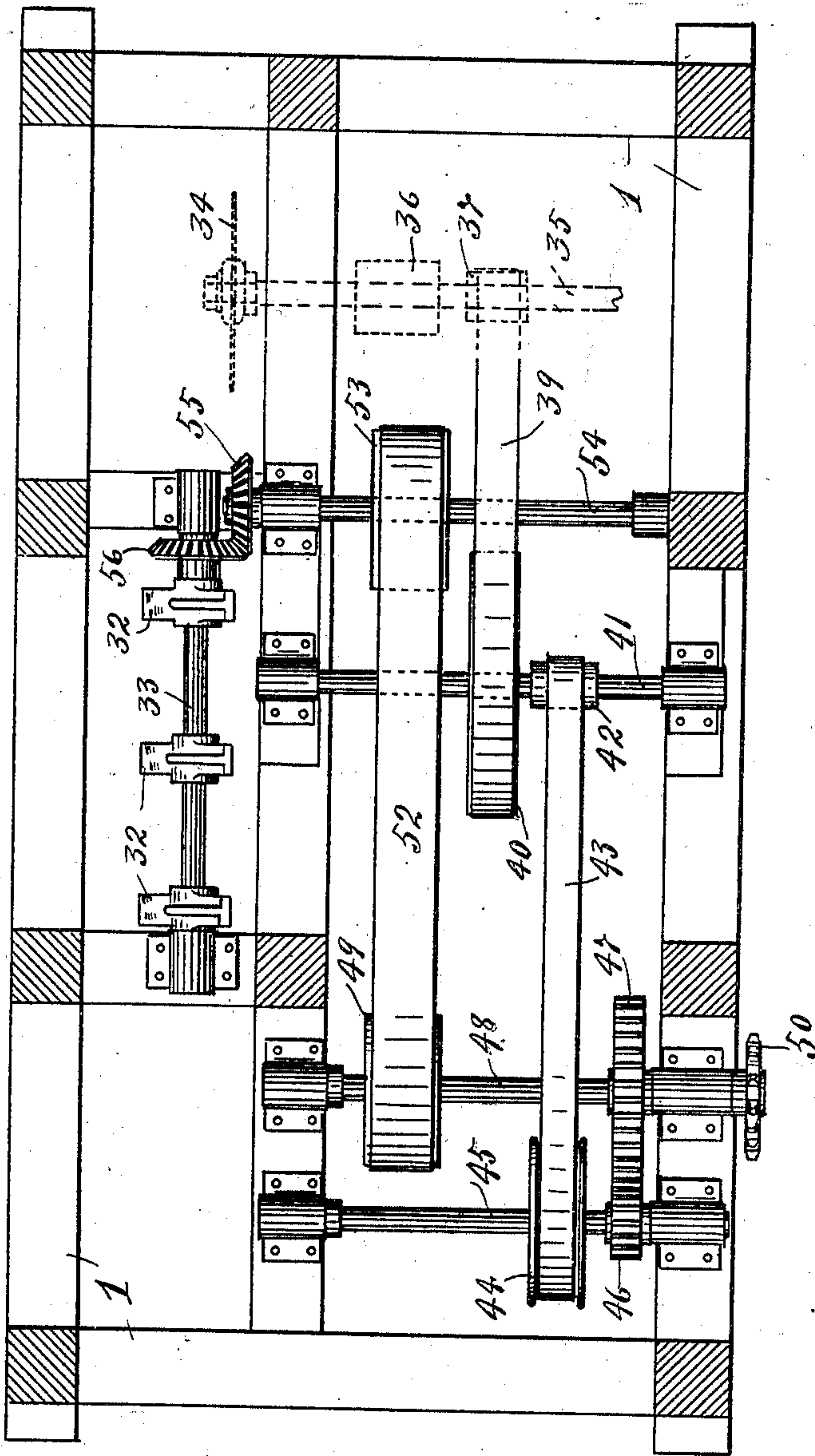
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Fig. 3.



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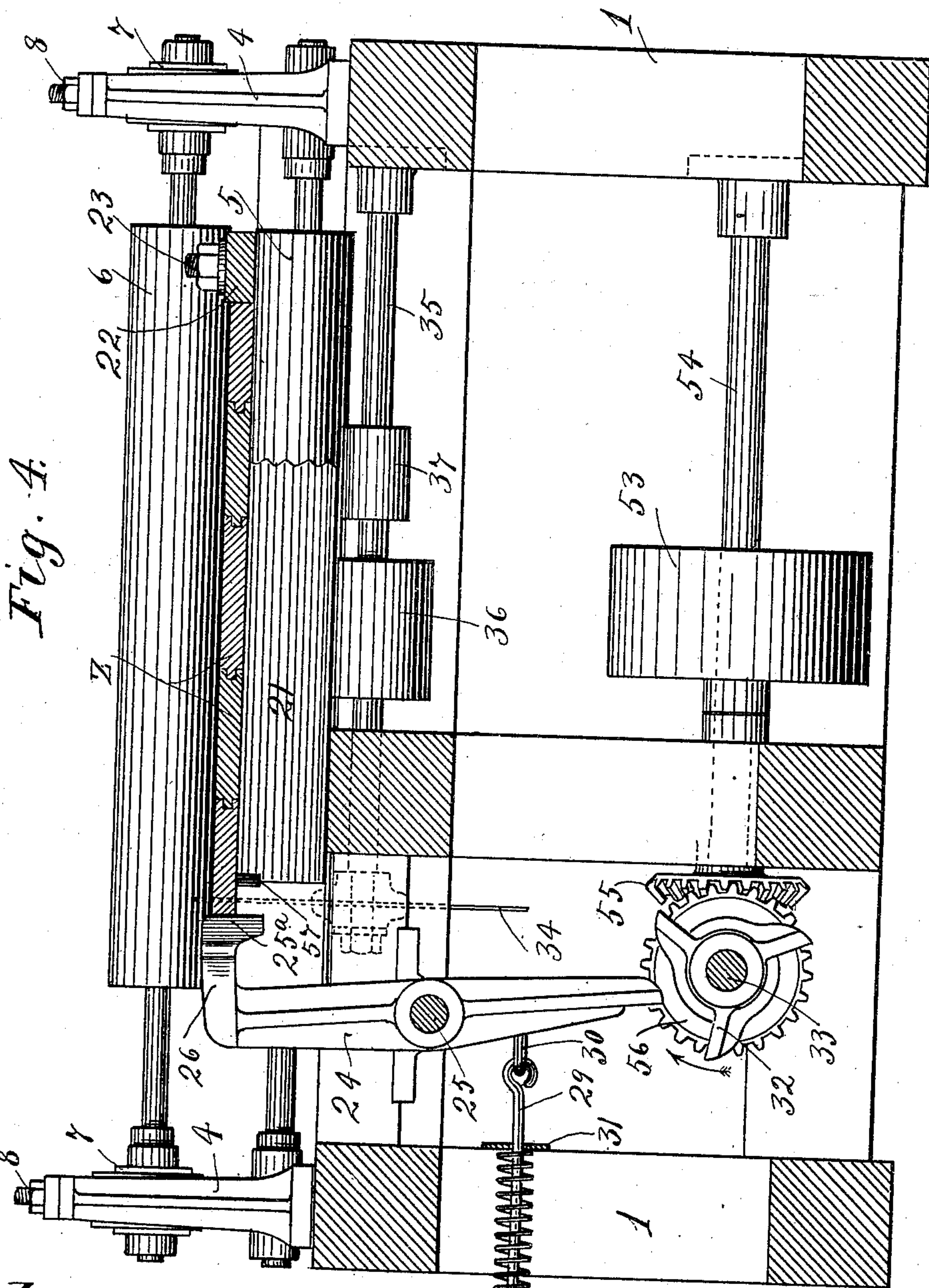
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5 Sheets—Sheet 4.



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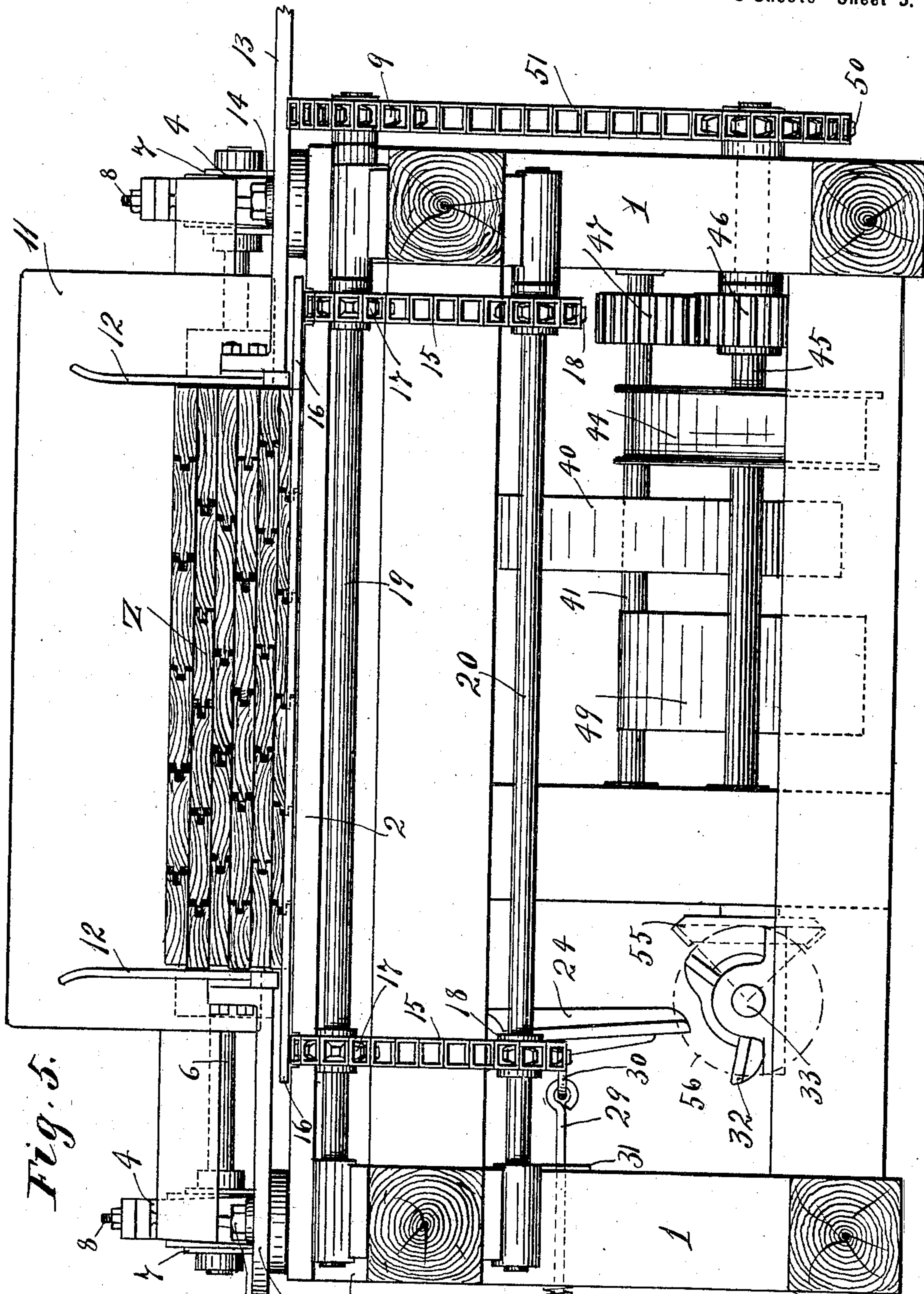


Fig. 5.

Witnesses.

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UNITED STATES PATENT OFFICE.

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MACHINE FOR FORMING BLANKS FROM MATCHED BOARDS.

SPECIFICATION forming part of Letters Patent No. 709,710, dated September 23, 1902.

Application filed April 15, 1902. Serial No. 102,973. (No model.)

To all whom it may concern:

Be it known that I, CHARLES JOHNSON, a citizen of the United States, residing at Minneapolis, in the county of Hennepin and State of Minnesota, have invented certain new and useful Improvements in Machines for Forming Blanks from Matched Boards; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My present invention has for its especial object to provide an improved machine for automatically forcing together matched lumber or boards—that is, boards having tongue-and-groove joints.

To the above ends the invention consists of the novel devices and combinations of devices hereinafter described, and defined in the claims.

My improved machine is especially adapted for use in putting together tongue-and-grooved boards or strips to thereby form relatively large composite boards or sections, which I herein term “blanks,” and which blanks are used in large quantities in making large shipping-boxes and for various other purposes.

The machine is illustrated in the accompanying drawings, wherein like characters indicate like parts throughout the several views.

Figure 1 is a side elevation of the complete machine. Fig. 2 is a plan view of the same. Fig. 3 is a horizontal section taken approximately on the line $x^3 x^3$ of Fig. 1. Fig. 4 is a transverse vertical section taken approximately on the line $x^4 x^4$ of Fig. 2, and Fig. 5 is an elevation looking at the receiving or feeding end of the machine.

The numeral 1 indicates a heavy rectangular framework, preferably formed of timbers. All of the parts of the machine are directly or indirectly supported from this frame. At the receiving end of the machine a horizontal face-plate or support 2 is rigidly supported from the frame 1, as shown, by blocks 3.

Mounted in brackets 4, rigidly supported on the sides of the frame 1, is a series of co-operating bed-rollers 5 and presser-rollers 6, arranged in pairs. The projecting shafts or

trunnions of the bed-rollers 5 are mounted in stationary bearings, while the shafts or trunnions of the presser-rollers 6 are directly mounted in vertically-adjustable boxes 7, which are guided and held by the bearing-brackets 4. Said presser-rollers are drawn downward, under the action of gravity, into positions limited by nuted adjusting-screws 8 of ordinary construction. The presser-rollers and bed-rollers are arranged with their contacting or closely-spaced surfaces approximately in the same horizontal plane with the upper surface of the face-plate 2.

The forward bed-roller 5 is the only positively-driven member of the whole series, and its projecting shaft is provided at one end with a sprocket 9, and just outward of the ends of said roller it is provided with sprockets 10 for purposes which will presently appear.

The boards or strips z , which are to form the blanks or sections, are laid loosely, one layer above the other, upon the face-plate 2 and within a suitable magazine afforded by a transverse stop-plate 11 and side plates 12, the former of which terminates above the face-plate 2, and, as shown, is rigidly supported from the adjacent pair of brackets 4, while the latter are adjustably secured to the face-plate 2 by slotted brackets 13 and co-operating nuted bolts 14.

The boards z are placed within the magazine extending longitudinally of the machine—that is, transversely of the bed and presser rollers. One layer of the boards—that is, one incomplected blank—at a time is fed from the bottom of the stack under the lower edge of the stop-plate 11 by means of a feeding device afforded by a pair of parallel sprocket-chains 15, connected by one or more, preferably two, transverse tie-bars 16. The sprocket-chains 15 run over the sprockets 10 of the positively-driven bed-roller and over guide-sprockets 17 and 18 of idle counter-shafts 19 and 20, respectively, which counter-shafts are journaled in suitable bearings on the frame 1. The bars 16 under the movements imparted to the sprocket-chains 15 are moved in succession forward over the face-plate 2, so as to carry forward the lower layer

of the strips and force the same positively between the cooperating rear pair of bed and presser rollers.

A bed-plate 21, suitably secured to the beams of the frame 1 and cut out to permit the bed-rollers to work therethrough, extends in a horizontal plane slightly below the tops of the said bed-rollers. A heavy guide-bar 22 is adjustably secured on the bed-plate 21 by slot-and-bolt connections 23. (Best shown in Figs. 2 and 4.) This guide-bar 22 extends at a right angle to the bed-rollers and presser-rollers, and it serves as a platen against which the boards of the blank are pressed or pounded, as will presently appear. The inner edge of the guide-bar 22 is set approximately in line with the inner surface of the correspondingside 12 of the supply-magazine, and its forward end is preferably slightly beveled, as shown at 22^a, to prevent the blank from being caught and stopped thereby. On the other side of the machine—to wit, on that side which is opposite to the guide-bar 22—are a plurality of hammers 24, afforded by levers 25 pivoted on a common shaft 25, fixed in suitable supports on the main frame 1. The upper ends of these levers or hammers 24 are in the form of flat striking-heads 26, having beveled forward edges 26^a. The heads 26 of these hammers are so positioned that they are adapted to strike the edge of the adjacent board of the blank, as will presently be more fully described.

Each hammer 24 is given its effective or working stroke under the action of an individual spring 27, which, as shown, acts upon a nut-held washer 28 on the free end of a rod 29, connected to the said hammer by an eye 30 or other suitable device. All of the springs 27 react against a common bar 31, secured to the frame 1.

The several hammers 24 are simultaneously set and released or thrown into action by tappets 32, shown as carried by a common counter-shaft 33 and provided each with three radial lugs or arms which engage in succession with the free lower ends of the respective hammers.

Near the delivery end of the machine and at that side thereof opposite to the guide 22 and located slightly inward of the hammers 24 is a circular saw 34, carried by a transverse saw mandrel or shaft 35, suitably mounted in bearings on the frame 1 and provided with pulleys 36 and 37. A power-driven belt 38 runs over the pulley 36 to impart motion to the saw-shaft and from thence to all the running or moving parts of the machine.

A belt 39 runs over the pulley 37 and over a relatively large pulley 40 of a counter-shaft 41, mounted in suitable bearings in the frame 1 and provided also with a relatively small pulley 42. A belt 43 runs over the small pulley 42 and over a relatively large pulley 44 on a counter-shaft 45, mounted in suitable bearings on the frame 1 and provided with a spur-pinion 46. The spur-pinion 46 meshes

with a spur-gear 47 of a counter-shaft 48, mounted in suitable bearings on the frame 1 and provided with a pulley 49 and a sprocket 50. As is evident, through the connections just described a relatively very slow motion is imparted from the saw-shaft to the counter-shaft 48.

A sprocket-chain 51 runs over the sprocket 50 of the shaft 48 and over the sprocket 9 of the power-driven bed-roller to impart movements to the latter, and hence to cause the same, in cooperation with the corresponding presser-roller, to feed rearward the boards or strips of the blank delivered thereto by the feed device 15 16.

A belt 52 runs over the pulley 49 of the shaft 48 and over a pulley 53 of a counter-shaft 54, mounted in suitable bearings on the frame 1 and provided also with a beveled gear 55, which meshes with a similar beveled wheel 56 on the tappet-shaft 33. It has now also been seen how motion is imparted from the saw-shaft to the tappet-shaft and tappets and from the latter to the several hammers. From what has already been said it will of course also be understood that the endless feed device 15 16 receives its motion from the sprockets 10 of the power-driven bed-roller.

To prevent the hammers from unduly pounding the adjacent edge of the bed-plate 21 in case they should be operated when there is no blank in position to receive the blows, buffers or cushion-blocks 57, of rubber or other suitable material, are set into the edge of the said bed-plate, as best shown in Figs. 2 and 4.

The operation of the machine, briefly summarized, is as follows: The tongue-and-grooved boards or strips which are to make up the blank or section are piled loosely in layers, extending in the direction of the line of feed movement which they are given by the machine and substantially as indicated in the drawings, to form a stack within the magazine afforded by the face-plate 2, end or stop board 11, and side boards 12. When one of the bars 16 strikes the ends of the boards or strips of the lower layer of the stack—that is, the layer lying or resting upon the face-plate 2—the first thing it does is to true up or aline the ends of the several boards and immediately thereafter carries the said boards bodily and together between the power-driven bed-roller and cooperating presser-roller, whereupon the said two rollers act as an auxiliary feeding device to force the said boards onward between the succeeding bed and presser rollers. As soon as the assembled boards are passed rearward of the first pair of rollers they are subjected to the pounding action of the first hammer 34, and the advance ends thereof are forced toward the guide 22, and the tongue-and-grooved connections thereof are driven together. As the said boards are fed onward they are subjected to the action of two and then to the action of all

three of the said hammers, which by operating almost continuously thereon drive the boards tightly together, so that all of their tongues and grooves are intermeshed. Since the hammers operate independently, although preferably simultaneously, each delivers its own blow, regardless of the action of the other and regardless of the irregularity or angle of the adjacent edge of the board which is to be struck. If the hammers were rigidly connected, one hammer might at times prevent the other hammers from striking the board. After the boards of the blank are tightly pressed together they are fed onward between the bed and presser rollers and finally discharged at the rear end of the machine as other layers of boards or incomplete blanks are fed from the magazine. Before the boards are discharged from the bed and presser rollers, however, the hammered edge of the blank or composite section is moved past the saw 34, and this hammered edge is thereby cut away and the blank or section reduced slightly in width and to the proper predetermined size. Thus the blanks are completed and are ready for sale for making boxes and for various other uses.

It will of course be understood that the machine above described is capable of many modifications within the scope of my invention, as herein set forth and claimed.

What I claim, and desire to secure by Letters Patent of the United States, is as follows:

1. The combination with means for feeding the boards endwise, of means for pressing the boards together edgewise, to unite the joints thereof, involving a plurality of hammers, means for setting said hammers under strain, and means for suddenly releasing them to ren-

der the same operative, substantially as described. 40

2. The combination with means for feeding the boards endwise, of means for pressing the boards together edgewise to unite the joints thereof, involving a plurality of independently-pivoted hammers, means for setting said hammers under strain and means for suddenly releasing them, to render the same operative substantially as described. 45

3. The combination with means for feeding the boards endwise, of means for pressing the boards together edgewise to unite the joints thereof, involving a plurality of independently-pivoted presser-hammers, a spring operating independently on each hammer and tending to render the same operative, and means for moving said hammers into retracted positions against the tension of the springs and then suddenly releasing the same, substantially as described. 50 55 60

4. The combination with means for feeding the boards endwise, of means for pressing the boards together edgewise to unite the joints thereof, involving a plurality of presser-hammers 24 independently pivoted at 25 and provided with hammering-heads 26 beveled at 25^a, springs 27 independently connected to said hammers 24, and tappets 32 operating one on each hammer 24 and serving to move the same against their springs 27 then to suddenly release the same, substantially as described. 65 70

In testimony whereof I affix my signature in presence of two witnesses.

CHARLES JOHNSON.

Witnesses:

ELIZABETH KELIHER,
F. D. MERCHANT.