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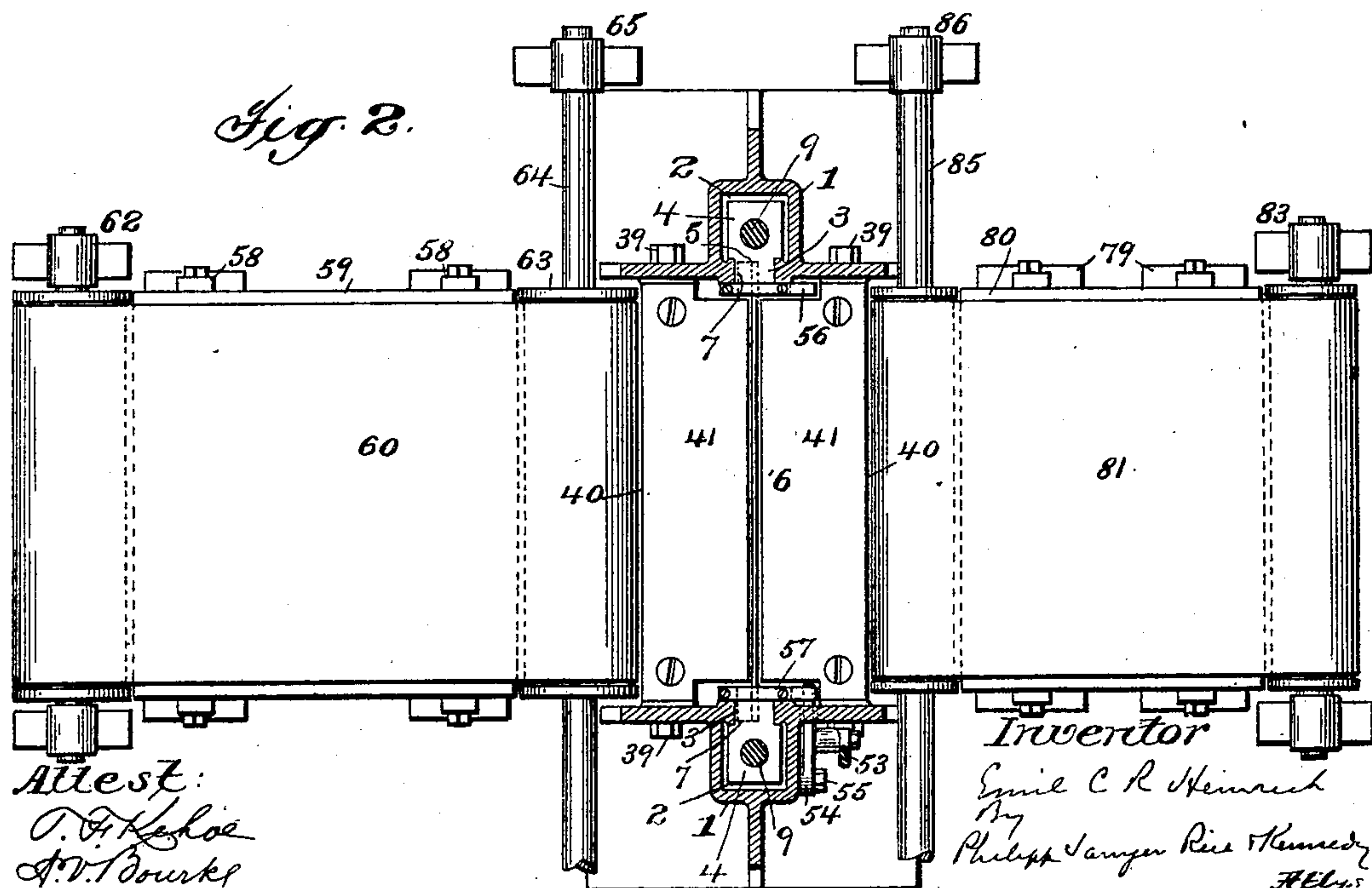
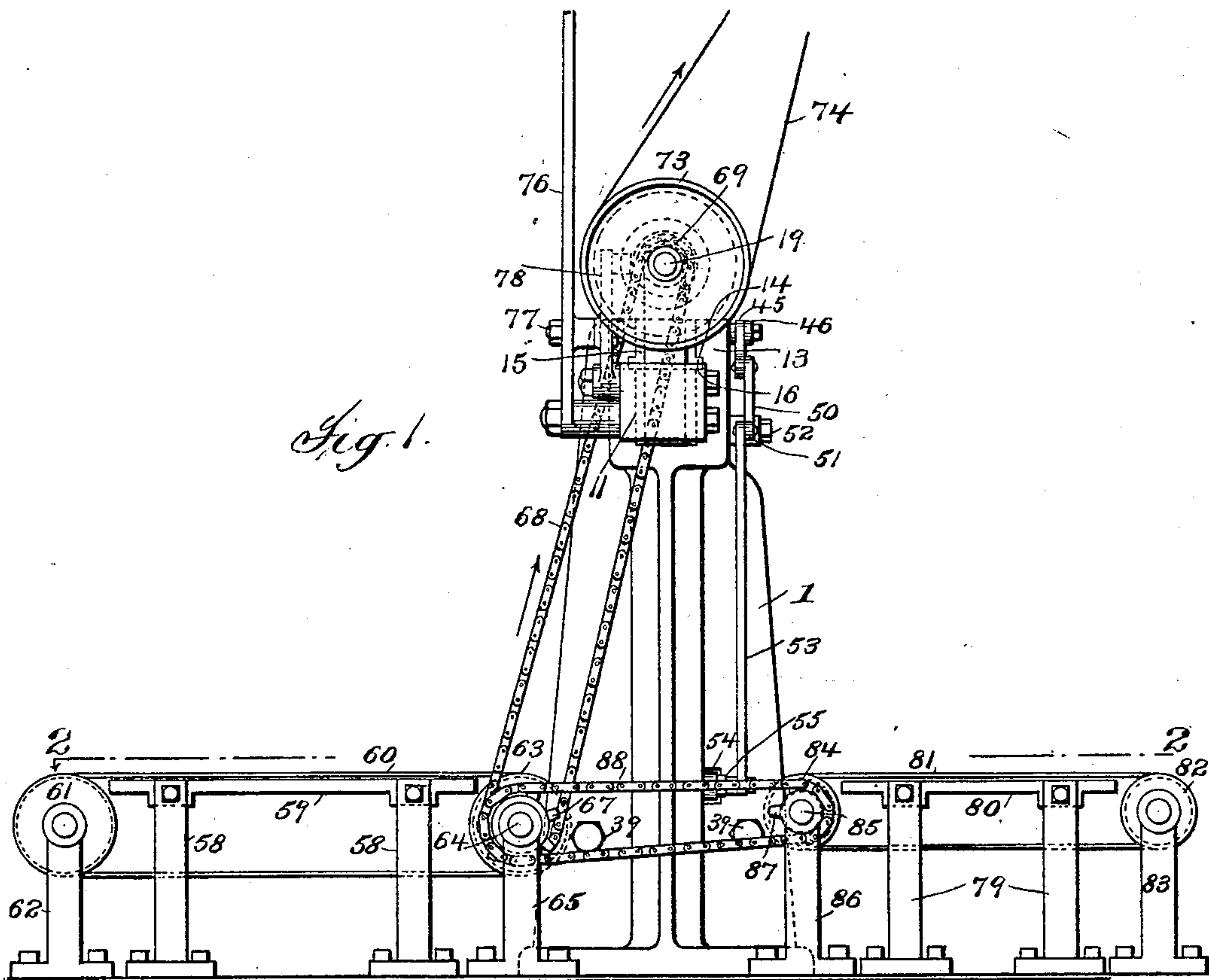
Patented Aug. 13, 1901.

E. C. R. HEINRICH.  
CUTTING MECHANISM.

(Application filed Sept. 12, 1900.)

(No Model.)

3 Sheets--Sheet 1.



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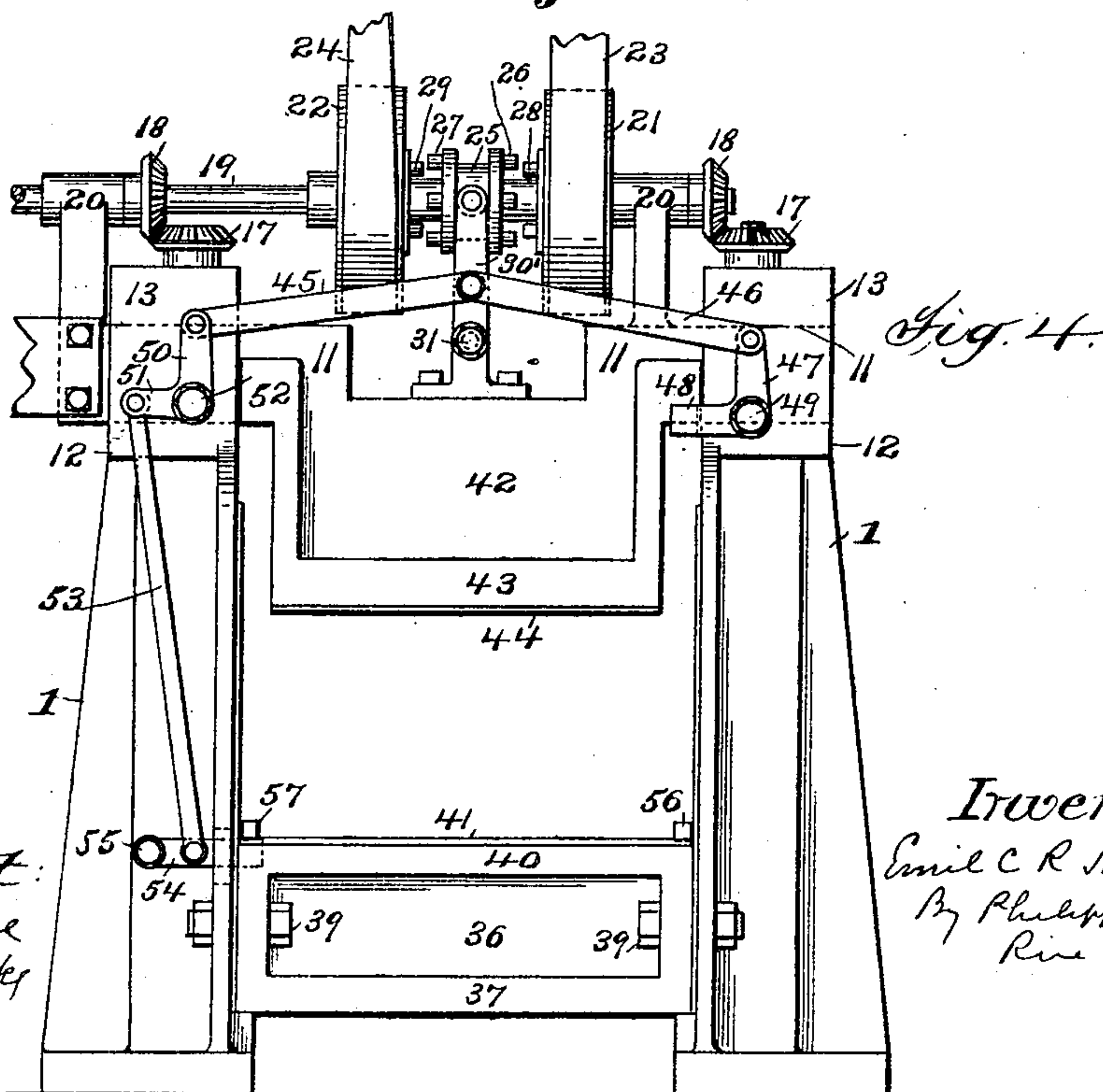
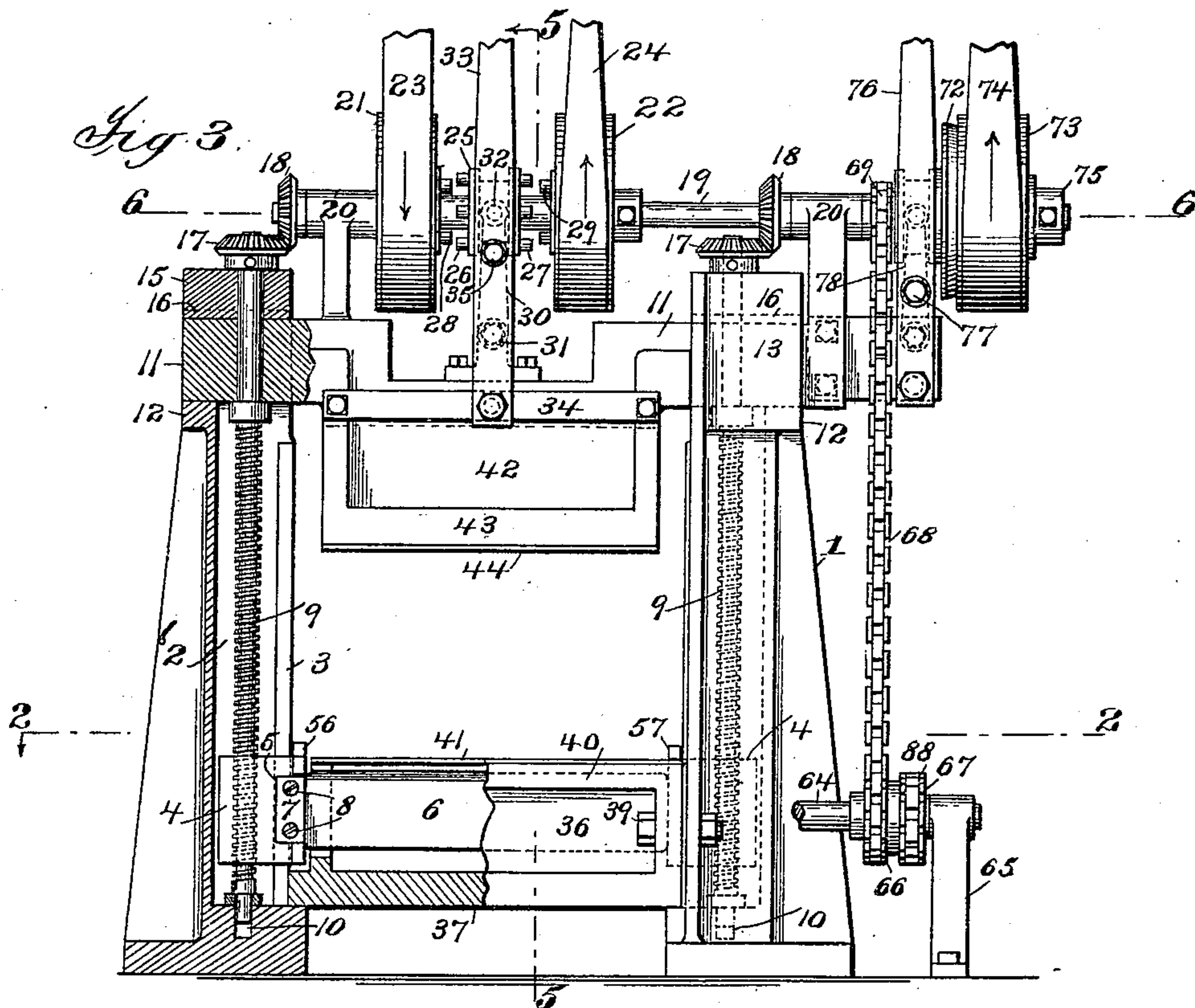
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3 Sheets—Sheet 2.



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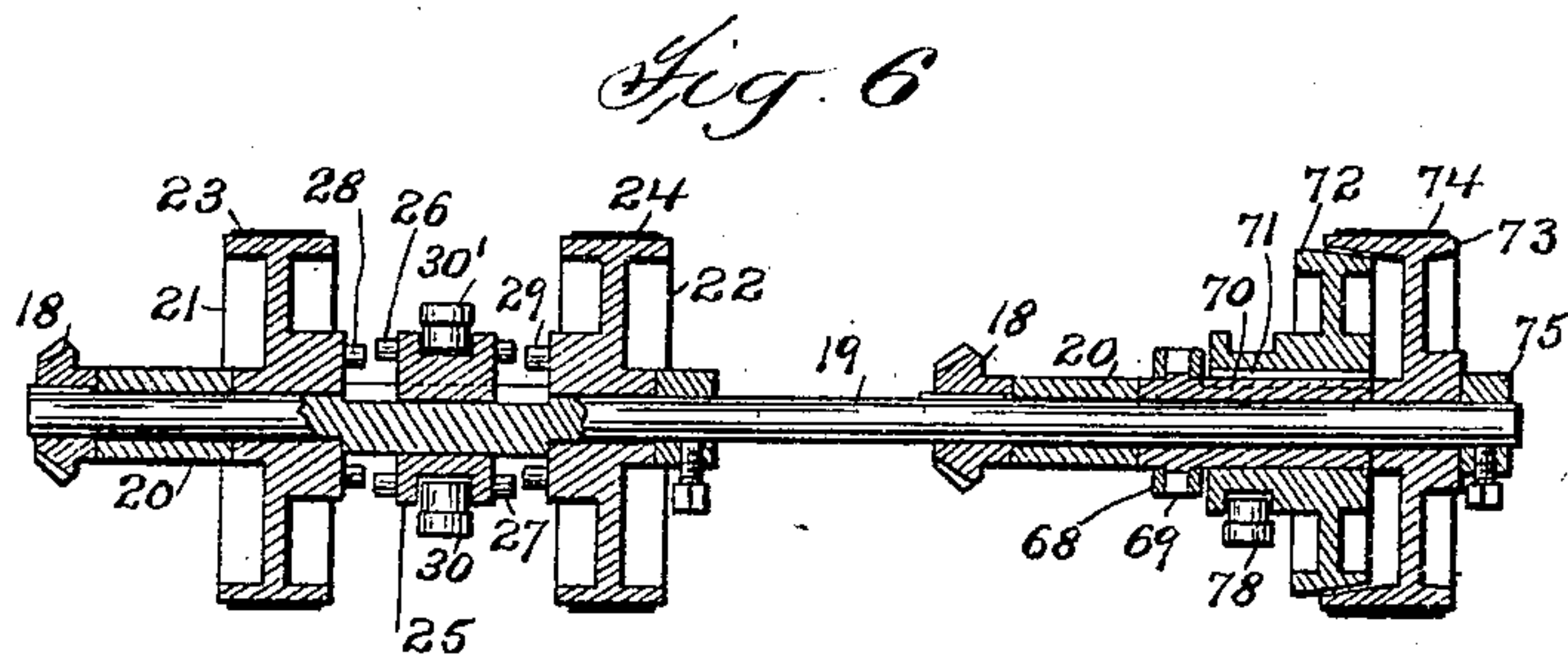
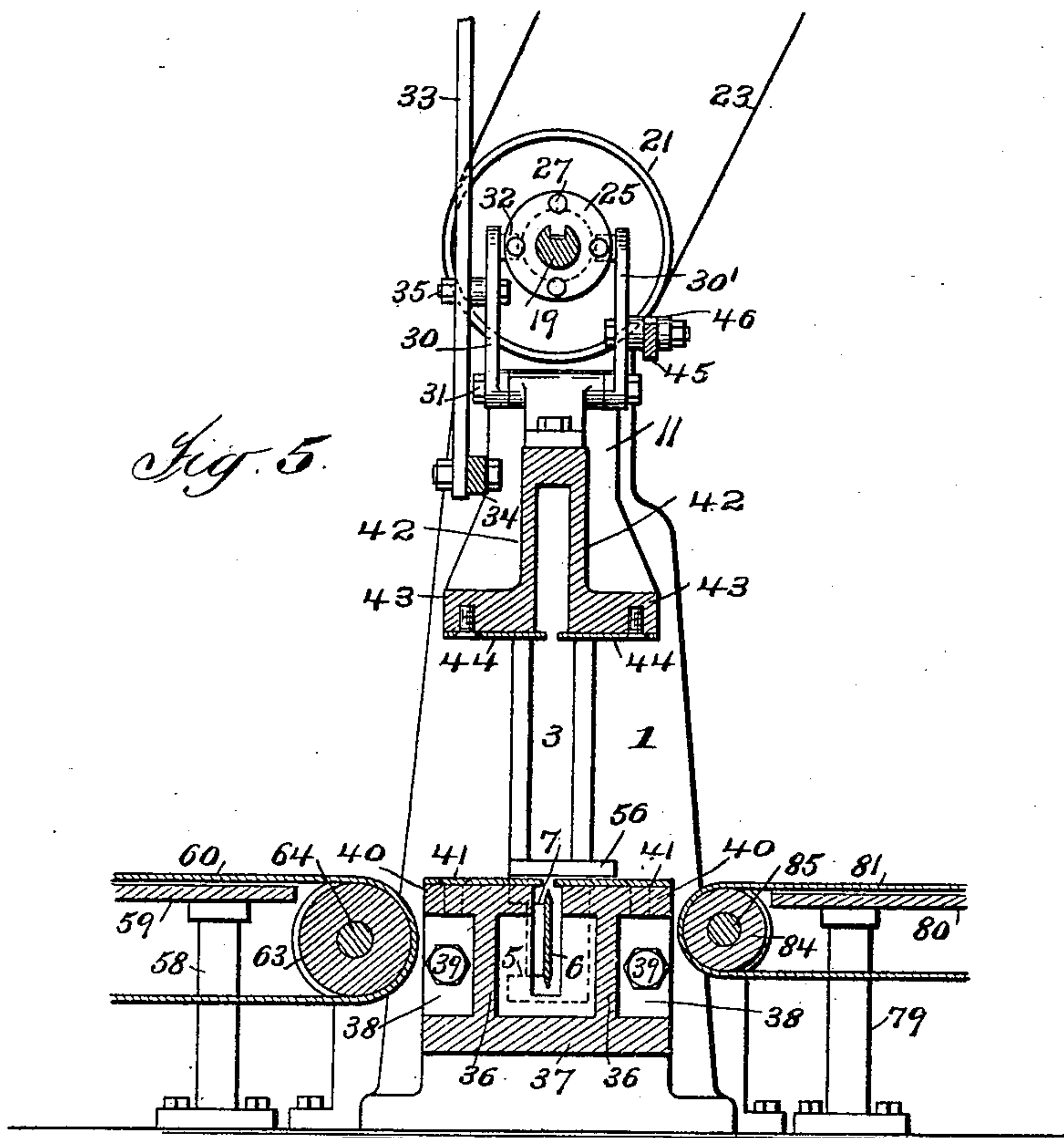
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3 Sheets—Sheet 3.



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# UNITED STATES PATENT OFFICE.

EMIL C. R. HEINRICH, OF WEST HOBOKEN, NEW JERSEY, ASSIGNOR TO  
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## CUTTING MECHANISM.

SPECIFICATION forming part of Letters Patent No. 680,378, dated August 13, 1901.

Application filed September 12, 1900. Serial No. 29,794. (No model.)

*To all whom it may concern:*

Be it known that I, EMIL C. R. HEINRICH, a citizen of the United States, residing at West Hoboken, county of Hudson, and State of New Jersey, have invented certain new and useful Improvements in Cutting Mechanism, fully described and represented in the following specification and the accompanying drawings, forming a part of the same.

10 This invention relates to certain improvements in cutting-machines, the invention having relation more particularly to machines intended for cutting licorice or other similar substances.

15 Licorice as ordinarily used in the arts is furnished to the consumer in large blocks or cakes, which are cut up by him into pieces the proper size for use. As is well known, licorice is extremely tenacious, somewhat elastic, and very adhesive. It is therefore exceedingly difficult to cut. In order to effect a cut, the cutting-knife should be held firmly in its carriage or holder, so as to avoid springing, and the driving mechanism must be powerful enough to force the knife through the tough elastic cakes. Furthermore, on account of the adhesive quality of the licorice the knife is liable to become foul almost immediately, and suitable means must be provided to prevent the licorice from adhering thereto in large quantities and for keeping it clean.

20 This invention has for its object to produce an improved cutting-machine which shall be adapted for cutting licorice and other analogous materials.

25 With this object in view the invention consists in certain constructions and in certain parts, improvements, and combinations, as will be hereinafter fully described and then particularly pointed out in the claims hereunto appended.

30 Referring to the drawings forming a part of this specification, and in which like characters of reference indicate the same parts, Figure 1 is a side elevation of a cutting-machine constructed in accordance with the invention. Fig. 2 is a horizontal sectional plan view of the construction shown in Fig. 1, the plane of section being indicated by the line 2 2 of that figure. Fig. 3 is a front elevation,

partly in section, of the construction shown in Fig. 1, the feeding devices being omitted. Fig. 4 is an elevation more particularly illustrating the stopping devices for the machine, a part of the driving mechanism being omitted. Fig. 5 is a section on the line 5 5 of Fig. 3. Fig. 6 is a sectional plan view illustrating the construction of the clutches and their operating mechanism.

60 Referring to the drawings, which illustrate a concrete embodiment of the invention, 1 indicates side pieces of the frame, which in the present form of the machine consist of upright standards. These side pieces are preferably provided with chambers 2, in which the driving devices for the knife-carrier are located, as will be hereinafter described, and with slots 3, which serve to guide the knife-carrier in its movement and prevent any lateral displacement thereof.

65 While the knife-carrier may be varied in form, it includes in the present construction a pair of blocks 4, which extend into the chamber 2, these blocks being guided in the slots 3 before described. It is of importance in the knife-carrier intended for cutting licorice and other analogous substances to prevent any lateral movement of the knife. The blocks 4 are accordingly arranged to fit snugly in the guiding-slots 3, so that they may have no lateral movement. As has been before indicated, the resisting qualities of licorice and other analogous substances are very great, and there is therefore a liability that the knife will spring or twist somewhat as it passes through the material. It is important, therefore, to connect the knife to its carrier in such a manner as to prevent, so far as possible, any springing movement of the knife. In the present construction this result is effected by providing each of the blocks 4 with a recess 5, in which the ends of the knife 6 fit. These recesses 5 are formed so that the knife fits snugly therein, and plates 7 are provided, which also fit in the recesses and hold the knife in place, these plates being secured in position in any suitable manner, but preferably by screws 8, which pass through the plates 7 and through the knife into the blocks 4. By this construction the knife is held firmly on both sides and also at the top and



bottom and is prevented from springing or twisting at these points of connection with the carrier.

Any suitable means may be provided for driving the knife-carrier, but these means must be of such a character as to advance it with a steady movement and with great power. Preferably, therefore, the driving devices for the knife-carrier will consist of screws 9, said screws engaging the threaded orifices in the blocks 4, so that the blocks form nuts therefor, the screws being located in the chambers 2 of the side pieces of the frames and being stepped at their lower ends in suitable bearings 10 in said side pieces. The said side pieces are connected at their upper ends by a heavy cross-bar 11, the ends of said bar resting upon bearing-surfaces 12, formed in the standards 1. The standards 1 have upright pieces 13 extending at each side and above the ends of the cross-bar 11, these upright portions 13 being provided with parts 14, which overhang the tops of the ends of the bar 11. Steel blocks 15, having wings 16, which are slightly inclined, as shown in dotted lines in Fig. 3, so as to form wedges, are driven in between the shoulders formed by the overhanging portions 14 and the top of each end of the cross-bar 11. By this construction the side pieces of the frame are securely tied together and the whole structure is adapted to stand the great strain which is put upon it during the cutting operation. The ends of the cross-bar 11 and the blocks 15 are perforated, as shown, and the ends of the screws 9 pass through them. The screws 9 may be driven in any suitable or desired manner. In the construction shown, however, each of the screws is provided at its upper end with a bevel-gear 17, said gears being engaged by similar gears 18, mounted on a power-shaft 19, extending across the machine and supported in bearings 20, suitably supported in the machine. The shaft 19 is provided with suitable driving devices, which operate to rotate it in opposite directions. In the construction shown these driving devices consist of loose pulleys 21 and 22, the pulley 21 being driven by a belt 23 and the pulley 22 by a cross-belt 24. Suitable means, such as a clutch, are provided for securing either of the pulleys 21 22 to the shaft 19. The clutch shown consists of a grooved collar 25, secured to the shaft by means of a feather, as shown in Fig. 6, or in any other suitable manner. This collar is provided with pins 26 and 27, the pins 26 being arranged to engage similar pins 28 on the hub of the pulley 21, the pins 27 engaging pins 29 on the hub of the pulley 22. In order to throw the clutch, a suitable lever 30 is provided, said lever being pivoted at 31 to a bracket mounted on the cross-bar 11 and being provided with a pin 32, which engages the groove in the collar 25. (See Fig. 3.) This lever is operated by means of a handle 33, pivoted to a bar 34 on the cross-bar 11,

the handle being loosely connected to the lever 30 by means of a suitable bolt 35.

As the licorice is extremely adhesive, considerable lumps are liable to break from the cake during the cutting operation and adhere to the knife, thus rendering it foul and interfering with its cutting qualities. Suitable means are therefore provided to apply some material to the knife which will prevent the licorice from adhering thereto in the manner stated. While these means may be varied widely in form and they may be arranged to apply any suitable material, the material preferably used will be glycerin, and it will preferably be contained in a receptacle in which the knife enters after passing through the block of licorice. In the construction shown the receptacle consists of an open-ended casing or tank, the sides of which are marked 36 and the bottom 37. Flanges 38 are provided at the ends of the receptacle, screws 39 passing through these flanges and into the standards 1. The open ends of the casing register with the guiding-slots 3 in the standards, so that in reality the lower portions of the chamber 2 are in communication with the glycerin-receptacle and the glycerin is contained in the lower ends of these chambers as well as in the receptacle. In order to provide a bearing-surface to support the cake of licorice during the cutting operation, the tank is formed with top flanges 40, and to these flanges are secured by screws or in any other suitable manner a slotted two-part bearing-plate 41. It will be understood that the glycerin while it prevents in a great measure the adherence of the licorice to the knife does not keep the knife entirely free therefrom. It does, however, prevent a considerable amount of licorice from adhering to the knife and softens up what does adhere, so that it may be readily removed. In order to remove the licorice that adheres to the knife, the two parts of the plate 41 are arranged close to the knife, so that the edges of the slot in the plate will act as scrapers. It is of course understood that the flanges 40 of the receptacle may be utilized for bearing-surfaces, if desired, the two-part plate 41 being omitted, in which case the opening between the flanges 40 will be made narrow enough so that the edges of the flanges will act as scraping devices.

The knife is preferably provided, as shown, with two cutting edges, so that it may operate to cut on both its up and its down stroke. When a knife having two cutting edges is employed, a bearing-surface is provided to prevent the cake of licorice from being lifted by the knife as it moves upward. In the construction shown the cross-bar 11 is provided with two downwardly-extending webs 42, said webs terminating in horizontal flanges 43, to which are secured, by means of screws or in any other suitable manner, a two-part bearing-plate 44. These flanges 43



and the plate 44 are arranged at a distance from the plate 40 sufficiently great to permit the cake of licorice to pass between them, and the webs 42 are spaced apart, as shown, to permit the knife on its upward stroke to enter between them.

While the machine might be arranged to apply glycerin to the knife at both ends of its stroke or after each cutting operation, it has been found in practice that it will usually be sufficient to apply the glycerin after each second cut. The present machine, therefore, is so organized as to apply the glycerin after the knife has completed its downward stroke. The two parts of the plate 44 are, however, preferably arranged at the proper distance from each other, so that its inner edges will act as scrapers and remove from the knife any licorice which may adhere thereto as it leaves the cake on its upward cutting movement. While the plate 44 is preferably employed, it will of course be understood that the flanges 43 may be faced off and the plate 44 omitted, if desired.

The machine is preferably provided with stopping devices, which throw the power mechanism out of operation after the knife has completed its cut in each direction. While these stopping devices may be varied in form in the present construction, a lever 30', similar to the lever 30, before described, is provided. This lever 30' preferably has two links 45 and 46 connected thereto. The link 46 is connected to one arm 47 of a bell-crank lever 47 48, said bell-crank being pivoted at 49 to the frame. In the same manner the link 45 is connected to one arm 50 of a bell-crank 50 51, which is pivoted to the frame at 52. The arm 51 of this bell-crank has connected to it a link 53, said link being connected to a lever 54, pivoted to the frame at 55. The knife-carrying frame is provided with two blocks 56 and 57, the block 56 being so arranged as to strike the arm 48 of the bell-crank 47 48 as the knife completes its upward movement and the block 57 being arranged to strike the lever 54 as the knife completes its downward movement. When either of the bell-crank arms 47 48 or 50 51 is actuated, it will be readily seen that the lever 30' is shifted and the clutch thrown out of engagement with the pulley 21 or 22, as the case may be, so as to permit these wheels to run loose on the shaft 19, thus bringing the knife-driving mechanism to a stop.

Suitable means are preferably provided for feeding the blocks of licorice or other substance to be cut to and away from the cutting mechanism. While these means may be varied in form, in the construction shown standards 58 are provided on the entrance side of the machine, these standards serving to support a table 59, over which runs a belt 60, said belt also passing over a drum 61, mounted in bearings in standards 62, and over a drum 63, mounted on a shaft 64, said shaft being journaled in bearings in standards 65. The shaft

64 is provided with two sprocket-wheels 66 and 67. A sprocket-chain 68 passes around the wheel 66 and a sprocket-wheel 69, secured to a hub 70, loosely mounted on the shaft 19. Secured to this hub 70 by means of a feather 71 or in any other suitable manner is a wheel 72, which forms one part of a clutch. The other part of the clutch consists of a wheel 73, which is also loosely mounted on the shaft 19 and which is driven in any suitable manner, as by means of a belt 74, running to any suitable mechanism. A collar 75 is provided to hold the clutch members in proper position on the shaft. The members 72 and 73 constitute an ordinary friction-clutch, the operation of which is well understood, and while it is well adapted for the purpose for which it is used any other suitable form of clutch may be substituted therefor. The clutch is controlled by means of a lever 76, suitably pivoted to the frame. This lever has connected to it by means of a pin 77 or in any other suitable manner a second lever 78, which has a pin engaging a groove in the hub of the member 72.

In order to deliver the cut material out of the machine, a feeding-out mechanism is provided which, as shown, comprises standards 79, supporting a table 80, over which runs a belt 81. The belt 81 also runs over a drum 82, mounted in suitable bearings in standards 83, and over a drum 84, mounted on a shaft 85, which is journaled in suitable bearings in standards 86. The shaft 85 is provided with a sprocket-wheel 87 and a sprocket-chain 88, which passes over this wheel and the wheel 67, before described as mounted on the shaft 64. When the clutch members 72 73 are in engagement, therefore, the feeding-in and feeding-out mechanism will be driven, and when they are disengaged these feeding mechanisms will be at rest.

The specific operation of the mechanism will be apparent from the preceding description, and a further recital of it is not therefore necessary.

It will be understood that the construction by which the several features of the invention are carried into effect may be varied within wide limits. The invention is not to be limited, therefore, to the specific mechanism herein shown and described.

What I claim is—

1. In a cutting mechanism, the combination with a knife, of means for supporting and operating it, and a receptacle containing a liquid bath located in the path of travel of the knife and into which the knife enters after passing through the substance to be cut, substantially as described.

2. In a cutting mechanism, the combination with a knife, of means for supporting and operating it, and a receptacle containing a liquid bath located in the path of travel of the knife and into which the knife enters after passing through the material to be cut, the mouth of said receptacle being provided with



means for removing from the knife any portions of material to be cut which may adhere thereto, substantially as described.

3. In a cutting mechanism, the combination with a knife, of means for supporting and operating it, of a receptacle containing a liquid bath located in the path of travel of the knife and into which the knife enters after passing through the material to be cut, the mouth of said receptacle being provided with scraping edges, substantially as described.

4. In a cutting mechanism, the combination with a knife, of means for supporting and operating it, a bearing-surface for the material to be cut, said surface being provided with means for removing from the knife any portions of material which may adhere thereto, and a fluid-receptacle located behind the surface and into which the knife enters after passing through the material, substantially as described.

5. In a cutting mechanism, the combination with a knife, of means for supporting and operating it, a bearing-surface for the material to be cut, said surface being provided with a slot the edges of which operate as scraping devices, and a fluid-receptacle located behind the surface and into which the knife enters after passing through the material, substantially as described.

6. In a cutting mechanism, the combination with a knife, of means for supporting and operating it, and bearing-plates against which the substance to be cut may be forced during the cutting operation, said plates being provided with slots into which the knife enters after passing through the substance, the edges of the slots being arranged to act as scraping devices, substantially as described.

7. In a cutting mechanism, the combination with a knife, of means for supporting and operating it, bearing-plates against which the substance to be cut may be forced during the cutting operation, said plates being provided with slots into which the knife enters after passing through the substance the edges of the slots being arranged to act as scraping devices, and a fluid-receptacle arranged behind one of the plates and in the path of the knife, substantially as described.

8. In a cutting mechanism, the combination with a frame having slotted side pieces, of a knife-carrier guided in the slots of the side pieces, means for moving the carrier, a knife secured to the carrier, a bearing-plate supported in the frame having a slot into which the knife enters after passing through the material, and a fluid-receptacle arranged behind the bearing-plate and in the path of the knife, substantially as described.

9. In a cutting mechanism, the combination with a frame having slotted side pieces, of a knife-carrier guided in the slots of the side pieces, means for moving the carrier, a knife secured to the carrier, a bearing-plate supported in the frame having a slot into which the knife enters after passing through the ma-

terial, the edges of said slot being arranged to act as scraping devices, and a fluid-receptacle arranged behind the bearing-plate and in the path of the knife, substantially as described.

10. In a cutting mechanism, the combination with the frame having slotted and chambered side pieces, screws located in the chambers of the side pieces, nuts arranged in the chambers of the side pieces and guided in the slots said nuts forming a carrier, a knife connected to the nuts, means for rotating the screws, and a bearing-plate supported in the frame, said plate having a slot into which the knife enters, the edges of the slot being arranged to act as a scraping device, substantially as described.

11. In a cutting mechanism, the combination with the frame having slotted and chambered side pieces, screws located in the chambers of the side pieces, nuts arranged in the chambers of the side pieces and guided in the slots said nuts forming a carrier, a knife connected to the nuts, means for rotating the screws, a bearing-plate supported in the frame, said plate having a slot into which the knife enters, and a fluid-receptacle arranged behind the plate, substantially as described.

12. In a cutting mechanism, the combination with the frame having slotted and chambered side pieces, screws located in the chambers of the side pieces, nuts arranged in the chambers of the side pieces and guided in the slots said nuts forming a carrier, a knife connected to the nuts, means for rotating the screws, a bearing-plates supported in the frame, said plate having a slot into which the knife enters, the edges of the slot being arranged to act as a scraping device, and a fluid-receptacle arranged behind the plate, substantially as described.

13. In a cutting mechanism, the combination with the frame having slotted sides, of a knife-carrier guided in the slots of the frame, a knife secured to the carrier, means for driving the carrier, slotted bearing-plates supported in the frames and located at each end of the travel of the knife, and a fluid-receptacle arranged behind one of the plates, substantially as described.

14. In a cutting mechanism, the combination with the frame having slotted sides, of a knife-carrier guided in the slots of the frame, a knife secured to the carrier, means for driving the carrier, slotted bearing-plates supported in the frames and located at each end of the travel of the knife the edges of the slots being arranged to act as scraping devices, and a fluid-receptacle arranged behind one of the plates and in the path of travel of the knife, substantially as described.

15. In a cutting mechanism, the combination with a frame having slotted and chambered sides, of screws located in the chambers of the sides, nuts engaging the screws, a knife secured to the nuts, means for rotating the screws, and a slotted bearing-plate at each



end of the travel of the knife, the edges of the slot being arranged to act as scraping devices, substantially as described.

16. In a cutting mechanism, the combination with a frame having slotted and chambered sides, of screws located in the chambers of the sides, nuts engaging the screws, a knife secured to the nuts, means for rotating the screws, a slotted bearing-plate at each end of the travel of the knife the edges of the slot being arranged to act as scraping devices, and a fluid-receptacle located behind one of the bearing-plates and in the path of travel of the knife, substantially as described.

17. In a cutting mechanism, the combination with a frame having slotted sides, a knife-carrier guided in the slots of the sides, a knife secured to the carrier, means for driving the carrier, a slotted bearing-plate supported in the frame the edges of the slot being arranged to act as scraping devices, a power mechanism for the carrier-driving means, and automatic devices for disconnecting the power mechanism from the driving means after the knife has entered the slot in the bearing-plate, substantially as described.

18. In a cutting mechanism, the combination with a frame having slotted sides, a knife-carrier guided in the slots of the sides, a knife secured to the carrier, means for driving the carrier, a slotted bearing-plate supported in the frame the edges of the slot being arranged to act as scraping devices, a power mechanism for the carrier-driving means, automatic devices for disconnecting the power mechanism from the driving means after the knife has entered the slot in the bearing-plate, and a fluid-receptacle located behind the slotted plate and in the path of the knife, substantially as described.

19. In a cutting mechanism, the combination with a frame having slotted sides, of a knife-carrier guided in the slots of the sides, means for driving the carrier, slotted bearing-plates supported in the frame and located at each end of the travel of the knife, the edges of said slots being arranged to act as scraping devices for the knife, a power mechanism for the carrier-driving means, and automatic stopping devices arranged to disconnect the power mechanism from the driving means at each end of the travel of the knife, substantially as described.

20. In a cutting mechanism, the combination with a frame having slotted sides, of a knife-carrier guided in the slots of the sides, means for driving the carrier, slotted bearing-plates supported in the frame and located at each end of the travel of the knife the edges of said slots being arranged to act as scraping devices for the knife, a power mechanism for the carrier-driving means, automatic stopping devices arranged to disconnect the power mechanism from the driving means at each end of the travel of the knife, and a fluid-receptacle located behind one of

the bearing-plates and in the path of travel of the knife, substantially as described.

21. In a cutting mechanism, the combination with a carrier consisting of a pair of recessed blocks, a guide for each block arranged to prevent any lateral movement thereof, a knife-blade, the ends of said blade being located in the recesses in the blocks, and a cover-plate closing the recesses and serving to hold the knife firmly in the blocks, substantially as described.

22. In a cutting mechanism, the combination with a pair of slotted guides, of a knife-carrier consisting of a pair of recessed threaded blocks moving in the slots and guided thereby, screws engaging the threaded blocks, a knife-blade, the ends of which are located in the recesses in the threaded blocks, and cover-plates closing the recesses and serving to hold the knife-blade firmly in the threaded blocks, substantially as described.

23. In a cutting mechanism, the combination with a frame, of a knife-carrier supported and guided therein, means for operating the knife-carrier, a knife mounted on the carrier, a slotted bed-plate for supporting the substance to be cut, the edges of the slot being arranged to act as scraping devices, a feeding device arranged to deliver said substance to the bed-plate and advance it thereacross, and a fluid-receptacle behind the bed-plate and in the path of the knife, substantially as described.

24. In a cutting mechanism, the combination with a frame, of a knife-carrier supported and guided therein, means for operating the knife-carrier, a knife mounted on the carrier, a slotted bed-plate for supporting the substance to be cut, the edges of the slot being arranged to act as scraping devices, a feeding-belt arranged to deliver said substance to the bed-plate and advance it thereacross, means for operating the belt, and a fluid-receptacle behind the bed-plate and in the path of the knife, substantially as described.

25. In a cutting mechanism, the combination with a frame, of a knife-carrier supported and guided therein, means for operating the knife-carrier, a knife mounted on the carrier, a slotted bed-plate for supporting the substance to be cut the edges of the slot being arranged to act as scraping devices, a feeding-belt arranged to deliver said substance to the bed-plate and advance it thereacross, a second feeding-belt arranged to deliver the material after it is cut, means for driving both belts, and a fluid-receptacle located behind the bed-plate and in the path of the knife, substantially as described.

26. In a cutting mechanism, the combination with a frame having slotted sides, of a knife-carrier guided in the slots of the sides, means for driving the carrier, slotted bearing-plates supported in the frame, a power mechanism for operating the knife-driving means, and means operated by the knife at



each end of its movement for disconnecting the power mechanism from the knife-driving means, substantially as described.

27. In a cutting mechanism, the combination with a frame having slotted and chambered sides, of slotted bearing-plates supported in the frame, screws located in the chambers of the sides of the frame, nuts engaged by the screws and guided in the slots in the sides of the frame, a shaft for driving the screws, power devices for driving the shaft in opposite directions, a clutch for causing either power device to drive the shaft, shifting-levers for operating the clutch to disconnect the power devices from the shaft, and means whereby the knife-carrier operates a shifting-lever at each end of its stroke, substantially as described.

28. In a cutting mechanism, the combination with a frame having slotted and chambered sides, of slotted bearing-plates supported in the frame, screws located in the cham-

bers of the sides of the frame, nuts engaged by the screws and guided in the slots in the sides of the frame, a shaft for driving the screws, power devices for driving the shaft in opposite directions, a clutch for causing either power device to drive the shaft, shifting-levers for operating the clutch to disconnect the power devices from the shaft, means whereby the knife-carrier operates a shifting-lever at each end of its stroke, bearing-surfaces having slots through which the knife works, the edges of the slots being arranged to act as scraping devices, and a fluid-receptacle located behind one of the plates and in the path of the knife, substantially as described.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

EMIL C. R. HEINRICH.

Witnesses:

GEO. M. GALES,  
M. S. WATTS.