

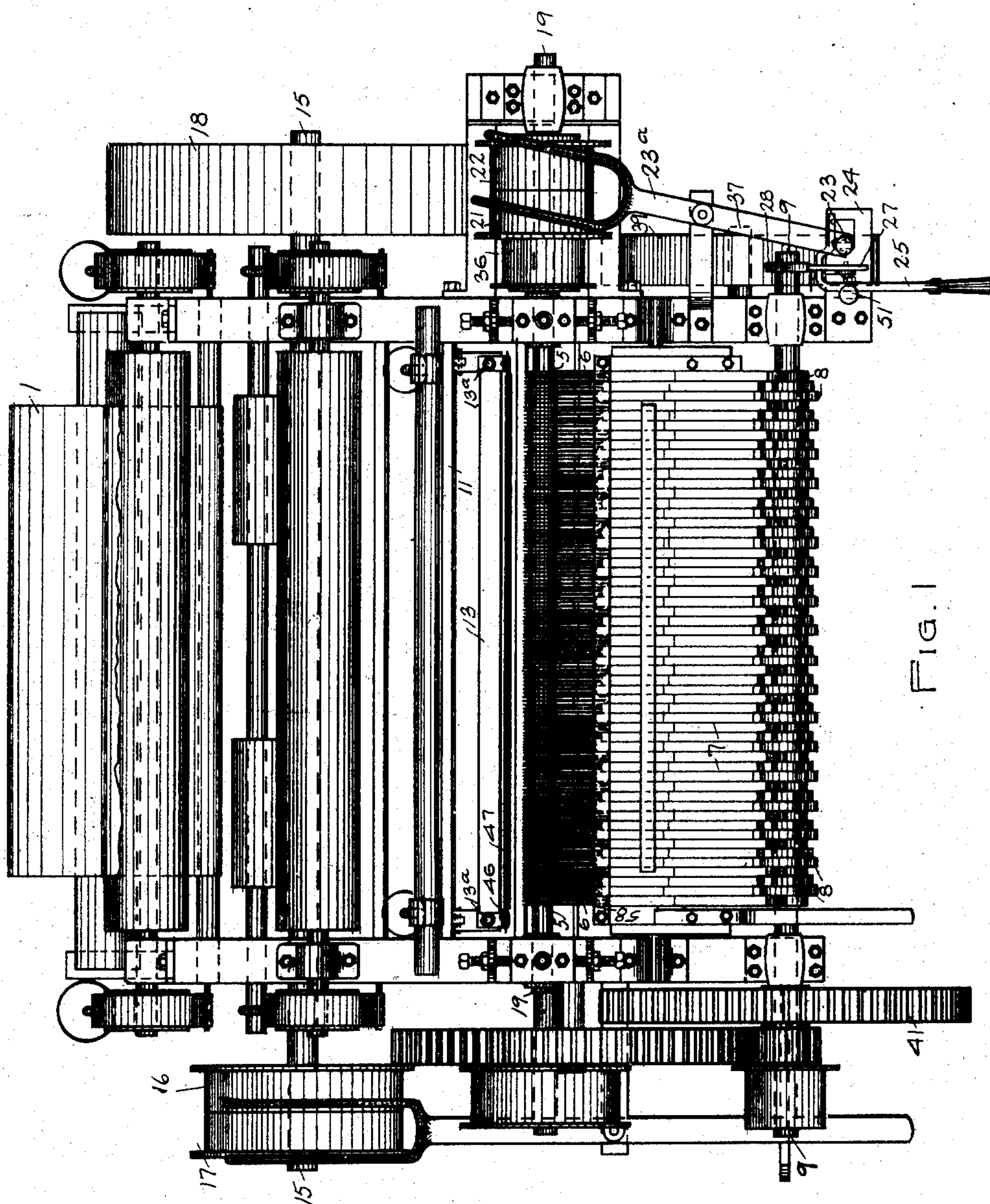
STOP MOTION FOR PILE CUTTING MACHINES.

APPLICATION FILED JUNE 8, 1903.

Patented Dec. 22, 1908.

6 SHEETS—SHEET 1.

**907,334.**



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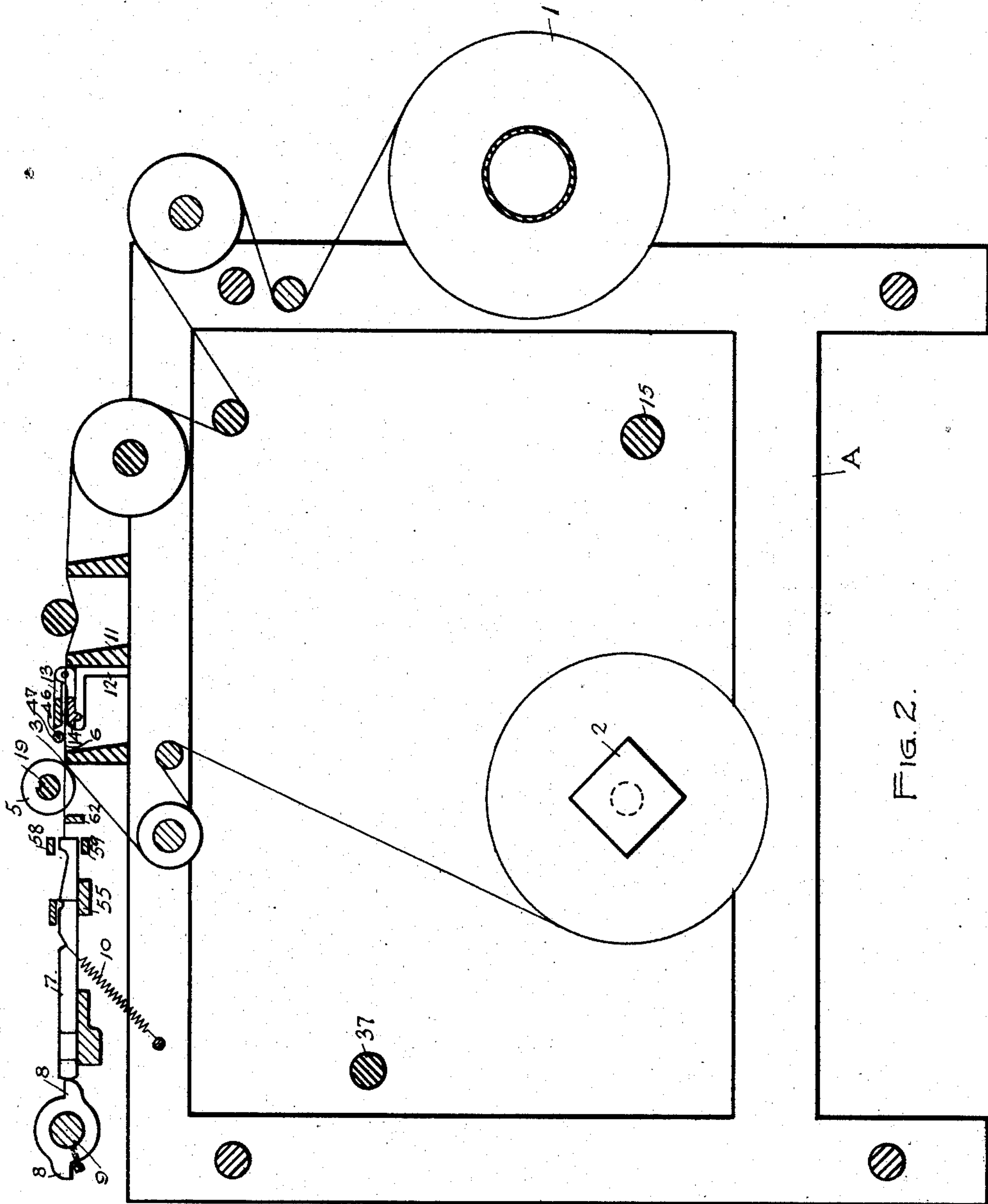
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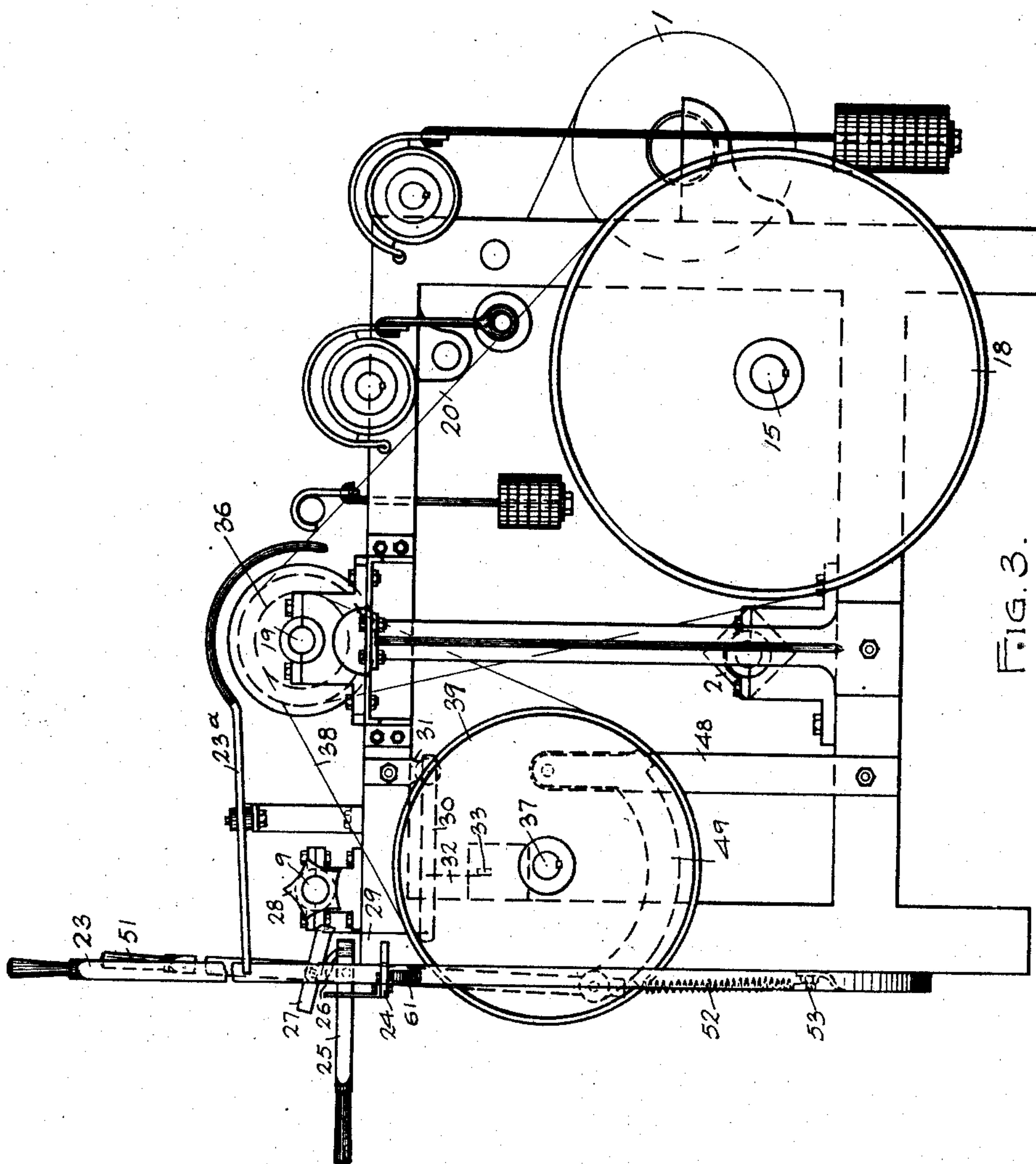


FIG. 3.

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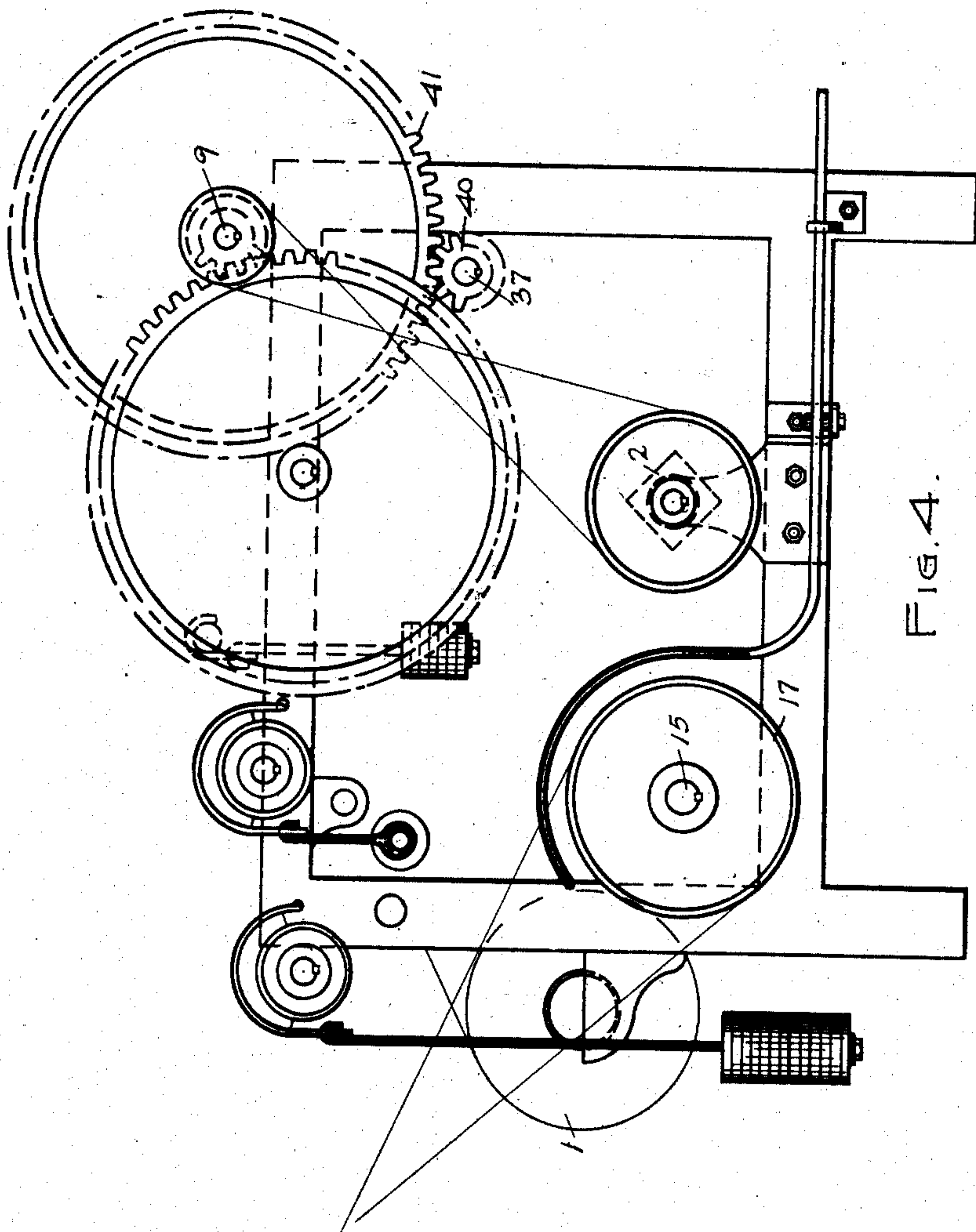
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WITNESSES

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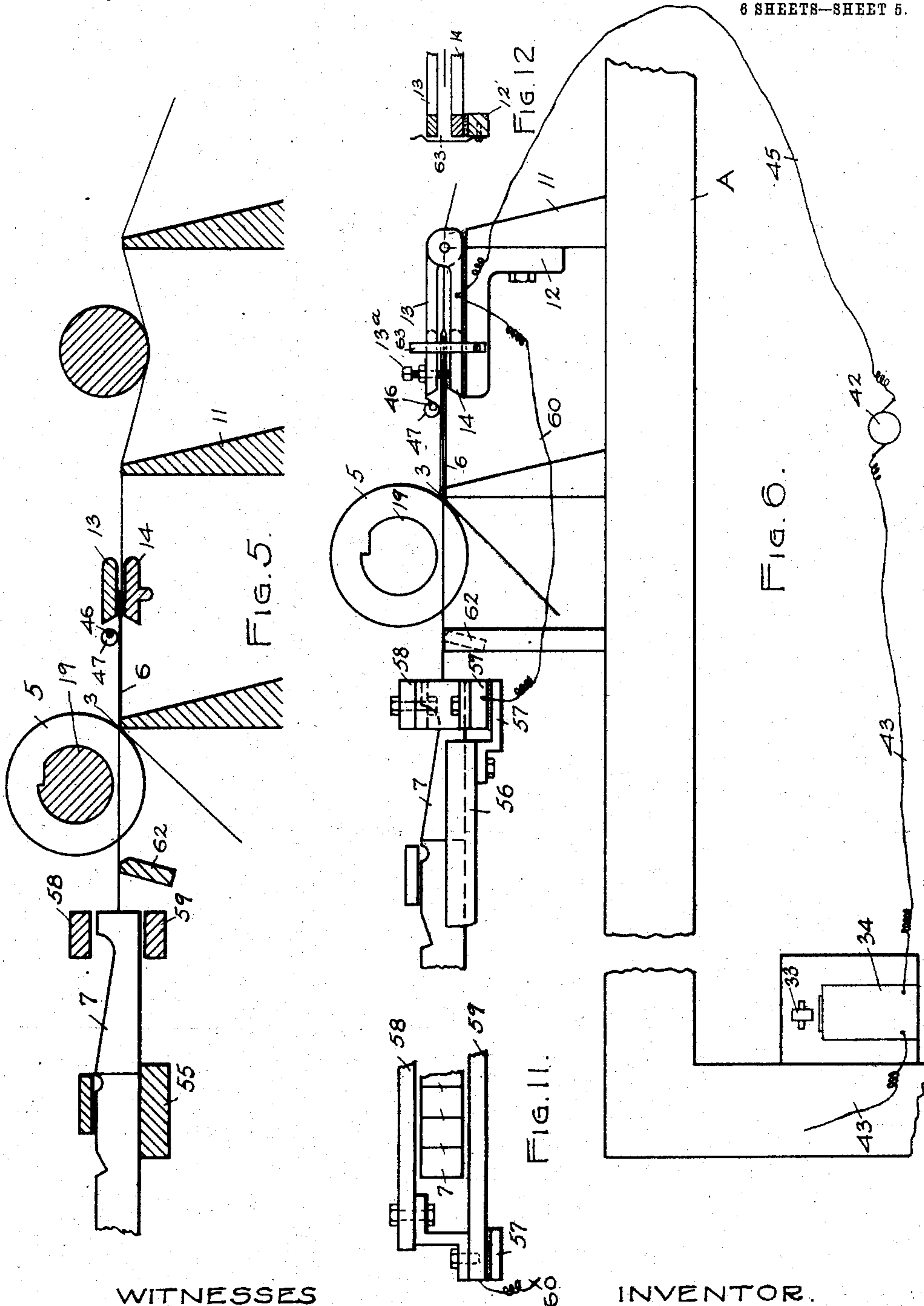
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6 SHEETS—SHEET 5.



WITNESSES

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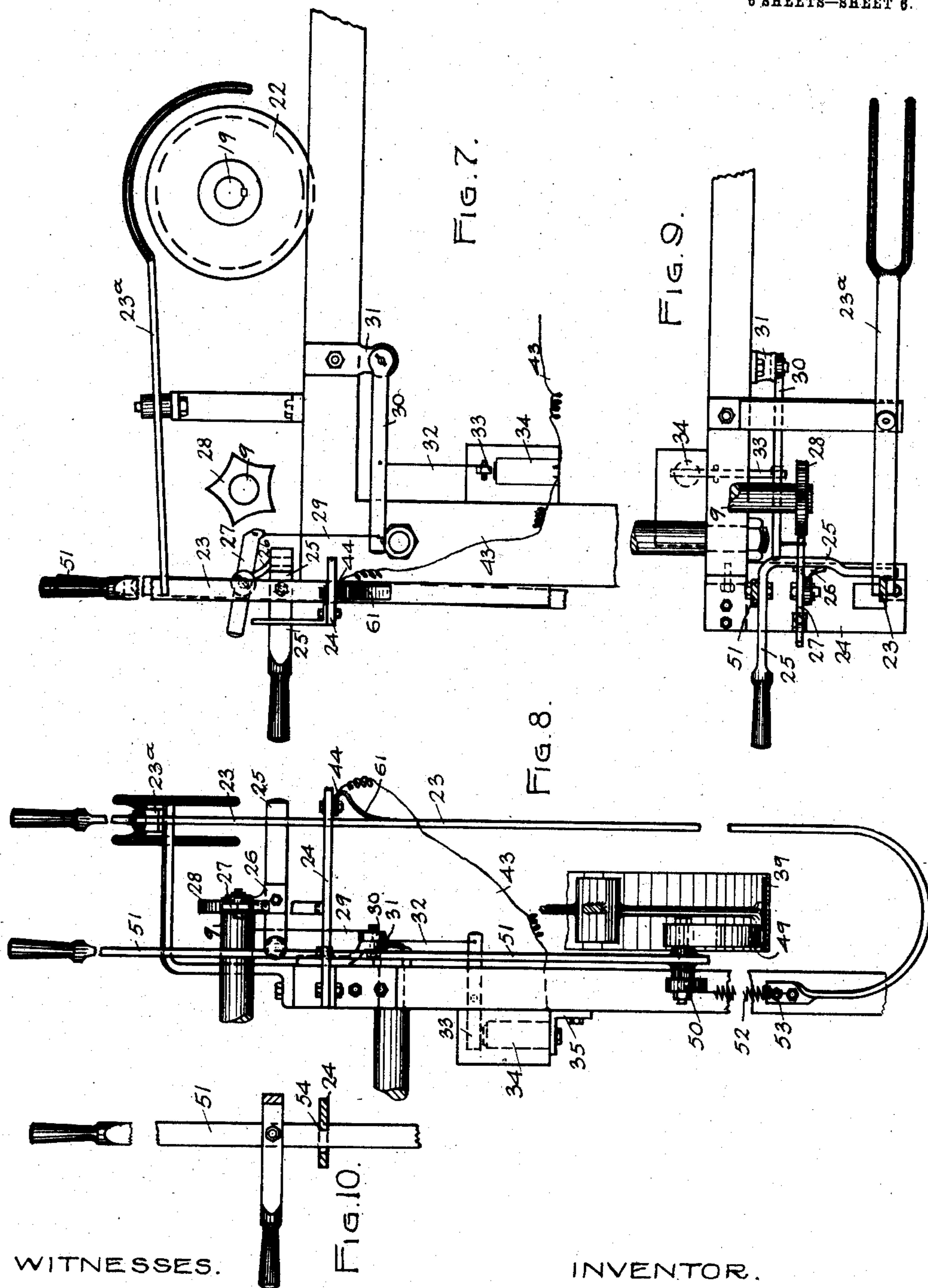
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# UNITED STATES PATENT OFFICE.

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## STOP-MOTION FOR PILE-CUTTING MACHINES.

No. 907,334.

Specification of Letters Patent.

Patented Dec. 22, 1908.

Application filed June 8, 1903. Serial No. 160,500.

*To all whom it may concern:*

Be it known that I, CHRISTOPHER G. GILDARD, of Swansea, in the county of Bristol and State of Massachusetts, have invented certain new and useful Improvements in Stop-Motions for Pile-Cutting Machines; and I do hereby declare the following specification, taken in connection with the accompanying drawings, forming a part of the same, to be a full, clear, and exact description thereof.

My invention relates more particularly to a stop-motion for that type of pile cutting machines in which a series of rotary knives or cutters is employed in connection with a series of separate and independently movable guides, one in each race of the fabric, which guides are advanced intermittently by co-operating pushers which are in turn actuated by a series of cams on a cam-shaft. In machines of this character there is liability that the point or forward end of a guide may be pushed through either the back or the face of the fabric, in which case it is important that the machine should be promptly stopped so that the guide may be properly reset in the race. So also there is a liability that the rear end of the guide may be bent out of alinement with its coacting pusher and so that the pusher will not act upon the guide to advance it. When this happens it is likewise important that the machine should be stopped in order that the guide may be straightened or a new one put in its place. A mechanical stop motion has heretofore been employed in machines of this type which was designed to act to stop the machine when the point of a guide was pushed through the back of the fabric, and a mechanical arrangement has been suggested which was designed to act to stop the machine when the point of a guide was pushed through the face of the fabric. By reason of the slender character of the guides any mechanism to be actuated thereby must necessarily be of a slender character, and because of this fact the mechanical stop motions heretofore employed or suggested have been very liable to fail to act when required, and have been unsatisfactory for the purpose for which they were intended. Furthermore there has not heretofore, so far as I am aware, been any stop motion applied to these machines designed to stop the machine when the rear end of a guide became bent so as to be out of aline-

ment with its pusher and so as not to be acted upon thereby.

The present invention has for its object to provide a stop motion which will not be liable to failure and which will be certain to act promptly and efficiently to stop the machine, when any one of the things above referred to shall occur.

To that end the invention consists primarily in the combination with a pile cutting machine of the type referred to of a stop mechanism which shall be actuated electrically; and in the operation of which the only work that the delicate guide is called upon to perform is simply to close an electric circuit.

The invention further consists in certain combinations of parts hereinafter described and claimed.

Referring to the drawings, Figure 1 is a plan view of a pile cutting machine embodying my invention; Fig. 2 is a central vertical section of the machine on an enlarged scale; Fig. 3 is a side elevation of the machine at the side on the right hand of the operator as he stands at the front of the machine; Fig. 4 is a side elevation of the opposite or left hand side of the machine; Fig. 5 is an enlarged sectional view of certain parts of the machine; Fig. 6 is a corresponding side elevation of the same parts and showing the electrical connections; Fig. 7 is a side elevation; Fig. 8 is an end elevation; Fig. 9 is a plan view of a part of the machine showing portions of the stop mechanism; Figs. 10, 11, and 12 are details.

A represents the frame of the machine.

1 represents the roll of cloth, the pile of which is to be cut, the cloth being wound upon a roller journaled in the frame. From the roll 1 the cloth is led around the usual bars and rolls, as shown in Fig. 2, but which are not necessary to be here described, as they are of usual construction and form no part of the present invention. The cloth after the pile has been cut is wound up upon the mandrel 2. In its passage through the machine the cloth is drawn under tension over the straight edge 3, as shown in Fig. 2 and on a larger scale in Fig. 5. In front of this straight edge and somewhat above the same is mounted the shaft 19 carrying the series of rotary knives or cutters 5.

6 represents the guides, one of which is caused to enter each race of the cloth. Each



of these guides is slotted and the corresponding rotary knife extends through the slot in said guide, as shown in Fig. 5.

7 represents the pushers, each of which is usually made of sufficient thickness to act upon two or more guides. Each pusher is advanced by the cams 8, 8 secured to the cam shaft 9, and is retracted by a spring 10, the guides being brought back by the movement of the fabric. The construction of this part of the machine and its operation in cutting the pile are well-known and need not be described in this connection. It may be noted, however, that the pushers and the guides are shown in the drawings in their advanced position.

As the guides 6 are advanced by the pushers there is a liability that the forward end of the guide may be pushed through either the front or the back of the cloth. In order to promptly stop the machine whenever this occurs, I provide the following mechanism. Projecting upward from the frame is a standard 11 which extends across the machine. Secured to this standard at each end thereof is a bracket 12. Secured to said brackets, but insulated therefrom, is a pair of electrodes 13, 14, in the form of bars extending across the machine, the lower bar 14 being secured to the bracket and the upper bar 13 being preferably hinged or pivoted to the lower bar by means of arms projecting from said bars at the ends thereof. By hinging the upper electrode it may be turned to facilitate the insertion of the cloth, and if desired the position of the electrode 13 with relation to the cloth may be adjusted by adjusting screws 13<sup>a</sup>.

15 is the driving shaft of the machine provided with the usual tight and loose pulleys 16 and 17. On the opposite end of the shaft 15 is a pulley 18 from which the knife-shaft 19 is driven by a belt 20, said knife-shaft being also provided with tight and loose pulleys 21, 22. The stop mechanism operates to stop the machine by shifting the belt 20 from the tight pulley 21 to the loose pulley 22, thereby stopping the knife-shaft and all parts of the machine except the main driving shaft.

A spring belt shipper 23 operating a forked lever 23<sup>a</sup> is employed for shipping the belt 20, said belt shipper being engaged in a notch in the plate 24 and thereby held under tension while the belt is on the tight pulley, and so that when released from said notch the belt shipper will spring into its normal position and thereby shift the belt on to the loose pulley.

In the arrangement shown in the drawings the release of the belt shipper 23 from the notch in the plate 24 is effected by a bar 25, which extends behind the belt shipper, and which is by the mechanism to be described pressed against said belt shipper when the

machine is to be stopped so as to move the belt shipper out of the notch in the plate 24. Secured to the bar 25 is a bracket 26 to the upper end of which is pivoted a lever 27, one end of which is normally out of the path of a cam wheel 28. The lever 27 is connected by a link 29 with a lever 30 pivoted to a bracket 31 secured to the frame. The lever 30 is connected by a link 32 to one end of the pivoted armature 33 of an electro magnet 34 mounted on a bracket 35 secured to the frame.

The cam wheel 28 is secured to one end of the cam shaft 9, this shaft being rotated from the knife shaft 19 by the following mechanism. Secured to the shaft 19 is a pulley 36 from which the shaft 37 is driven by means of the belt 38 and pulley 39. To the opposite end of the shaft 37 is secured a pinion 40 which meshes with a gear 41 on the cam shaft 9.

The electric circuit is as follows. Leading from the generator 42, or other source of electricity, one of the wires 43 leads to the electro magnet 34, and passing from said electro magnet is connected to the machine at any convenient point, as at 44, Fig. 8. The other wire 45 leading from the generator is connected with the electrode 14, which said electrode, it will be remembered, is insulated from the rest of the machine. All of the machine, except the portions heretofore referred to and to be hereafter referred to as being insulated, is normally included in the electric circuit, including the guides which enter the races, said guides being normally insulated from the electrodes 13, 14, by the cloth which surrounds them. Said guides therefore constitute electrodes which when brought into contact with either the electrode 13 or the electrode 14, or any other electrode, will serve to close the electric circuit.

The operation of the mechanism above described is as follows: Assuming the machine to be running with the belt on the tight pulley 21 and with the spring belt shipper 23 engaged and held by the notch in the plate 24, if the front end or point of any one of the guides 6 is pushed through the face of the cloth, it will come in contact with the electrode 13, thereby closing the electric circuit, and if the point of the guide is pushed through the back of the cloth it will come in contact with the electrode 14, likewise closing the circuit. Whenever the circuit is closed and the electro magnet 34 thereby energized, the resulting movement of the armature 33 will, through the link 32, lever 30 and link 29, raise the end of the lever 27 into the path of the rotating cam wheel 28. The engagement of one of the cams on the cam wheel 28 with the end of the lever 27 will impart to the lever 27 and to the bar 25 connected therewith a sliding movement



and cause the bar 25 to press against the spring belt shipper 23 and push it out of the notch in the plate 24, thereby releasing said belt shipper which will immediately spring

5 in the direction to shift the belt 20 from the tight pulley 21 to the loose pulley 22 and thereby stop the machine.

It sometimes happens that the forward end of a guide, after being pushed through the face of the cloth, will reënter the race, and this might occur before the end of the guide came in contact with the electrode 13. As it is equally desirable to stop the machine when this occurs, additional means are provided for closing the circuit under such circumstances. Supported from the electrode 13 by suitable brackets is a rod 46 extending across the machine, upon which rod is loosely mounted a coiled spring 47 which has a narrow contacting surface and which rides on the cloth as the cloth travels along, said spring being in contact with the rod 46 and thus in electrical connection with the electrode 13. If now the forward end of a guide should project through the face of the cloth and then again enter the race, a portion of such guide would be exposed and would come in contact with the coiled spring 47, thereby closing the electric circuit and stopping the machine, as before described.

In machines of this character, in order that when the machine is to be stopped it may be brought quickly to rest, it is customary to employ a brake mechanism which shall be brought into operation at the same time that the belt is shifted from the tight to the loose pulley. A further feature of the invention therefore consists in providing means whereby such brake mechanism may be operated simultaneously with the shifting of the belt 20 by the automatic stop mechanism above described.

Referring to Fig. 3, 48 is a standard secured to the frame, to the upper end of which is pivoted one end of a brake shoe 49 arranged within and so as to contact with the rim of the pulley 39. Projecting from the free end of the brake shoe 49 is a pin or stud 50 to which is connected a handle bar 51 for raising the brake shoe out of contact with the pulley rim. Connected to the pin 50 is one end of a coiled spring 52, the other end of which is secured to the frame at 53, said spring serving to pull the brake shoe into contact with the pulley rim when permitted to do so. The handle bar 51 passes through a slot in the plate 24 and is provided with a notch 54 to engage said plate, the handle bar being thereby held in its raised position and the brake shoe held out of contact with the pulley rim. As shown in Fig. 9, the bar 25 is bent at substantially right angles, and to this bent portion the handle bar 51 is secured, as shown in said Fig. 9. With this construction, when the bar 25 is moved by the cam

wheel 28 and lever 27 so as to disengage the spring belt shipper 23 from the notch in the plate 24, the handle bar 51 will likewise and simultaneously be moved so as to disengage its notch 54 from the plate 24, thereby permitting the spring 52 to pull the brake shoe 49 into contact with the rim of the pulley 39. Thus, as will be seen, the closing of the electric circuit not only causes the belt 20 to be shifted from the tight to the loose pulley, but also simultaneously causes the brake shoe to be pulled against the rim of the pulley 39.

To provide for the closing of the electric circuit, whenever the rear end of a guide becomes bent or sprung, either upward or downward, out of alinement with the forward end of the pusher, the following means are provided. The bar 55, upon which the pushers are supported and slide, is provided at each end with an extension 56 to which are secured brackets 57. Mounted upon said brackets 57, but insulated therefrom, as shown in Figs. 6 and 11, are two bars 58 and 59 which extend across the machine above and below the ends of the pushers and which constitute electrodes. A wire 60 leads from the electrode 14 to the electrode 59, as shown in Fig. 6. With this construction, if the rear end of a guide be bent or sprung or in any way deflected out of alinement with the forward end of the pusher and so as not to be acted upon by said pusher, the rear end of the guide will be brought into contact with either the upper electrode 58 or the lower electrode 59, as the case may be, thereby closing the electric circuit and causing the shifting of the belt 20 from the tight to the loose pulley and the application of the brake shoe 49 to the rim of the pulley 39 as before.

While it is not essential, it is preferred that, when the circuit has been closed in any of the ways above described and the belt has been thereby shifted and the brake applied and the machine brought to rest, the circuit shall be automatically opened. In the arrangement shown in the drawings this is accomplished in the following manner. Secured to one end of the plate 24, and insulated therefrom, is a flat spring 61 which, as shown in Figs. 7 and 8, bears against the side of the spring shipper bar 23 when said bar is held in the notch in the plate 24 to hold the belt on the tight pulley. When the said shipper bar is released from the notch in the plate 24 it springs away from said spring 61, thereby breaking the circuit at that point. As will be understood by those familiar with this type of pile cutting machine, the rotary knife or cutter 5 is always in contact with one or both of the walls of the groove in the guide through which the cutter passes, thereby always insuring a good electrical contact between the knife and guide and thus always maintaining the guide in the electric circuit. As will be seen in Fig. 5, the guide is also



brought into the circuit by reason of the fact that the rear end of the guide is in contact with a bar 62 which extends across the machine, said bar 62 forming a rest for the rear end of the guide.

Ordinarily several pieces of cloth are sewed or otherwise connected together end to end and wound upon the delivery roller so as to pass through the machine as a continuous web. As the races in which the guides travel are necessarily closed by the seam which joins the adjacent ends of two pieces, it is necessary to stop the machine when a seam approaches the guides, and remove the guides from the races and replace them in the races of the next piece beyond the seam. It is obvious that if the machine were not stopped when a seam approaches the guides the guides would bring up against the seam and be bent or broken and serious damage result. By the present invention means are also provided for automatically stopping the machine when a seam approaches the guides.

The seam referred to necessarily produces a bunch or a thick place in the web of cloth, and as the cloth travels between the electrodes 13 and 14, this bunch or thick place will serve to lift the upper pivoted electrode 13. By including in the electric circuit a spring 63, (see Fig. 12) connected in any suitable manner with the frame of the machine and arranged so that the lifting of the electrode 13 by the passage of the seam thereunder will cause said electrode to contact with said spring 63, the circuit will be closed and the machine stopped as before described.

It will be seen that with the construction and arrangement of parts above described the machine will be promptly stopped whenever any one of the guides is diverted from its normal position, and also whenever a seam approaches the guides.

While the features of invention above described are as a whole more particularly applicable to that type of pile cutting machine in which a series of rotary knives or cutters is employed, it is evident that certain features of the invention are equally applicable to other types of pile cutting machines.

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

1. In a pile cutting machine, the combina-

tion of a guide which enters a race of the cloth, an electric circuit which includes said guide as an electrode, and a companion electrode arranged to float upon the cloth and having a narrow contacting surface to adapt the same to contact with any portion of the guide which may be outside of the race and thereby close such circuit, substantially as described.

2. In a pile cutting machine, the combination of a guide which enters a race of the cloth, an electric circuit which includes said guide as an electrode, and a companion electrode consisting of a coiled spring loosely mounted to ride upon the upper surface of the cloth in position where any portion of the guide which may be outside of the race will contact therewith and close said circuit, substantially as described.

3. In a pile cutting machine, the combination of a guide which enters a race of the cloth, an electric circuit, means for closing said circuit to stop the machine when said guide is diverted from its normal position, and means independent of said electrode for opening said circuit after it has thus been closed, substantially as described.

4. In a pile cutting machine, the combination of a guide which enters a race of the cloth, mechanism for feeding the cloth, an electric circuit which includes said guide as an electrode, and a companion electrode adapted to be engaged by said guide when diverted from its normal position and also adapted to be operated by a thickened portion of the cloth to close the circuit, substantially as described.

5. In a pile cutting machine, the combination of a guide which enters a race of the cloth, mechanism for feeding the cloth, an electric circuit which includes said guide as an electrode, a pivoted electrode adapted to be engaged by said guide when diverted from its normal position, said pivoted electrode being also adapted to be operated by a thickened portion of the cloth to close said circuit, substantially as described.

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Witnesses:

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